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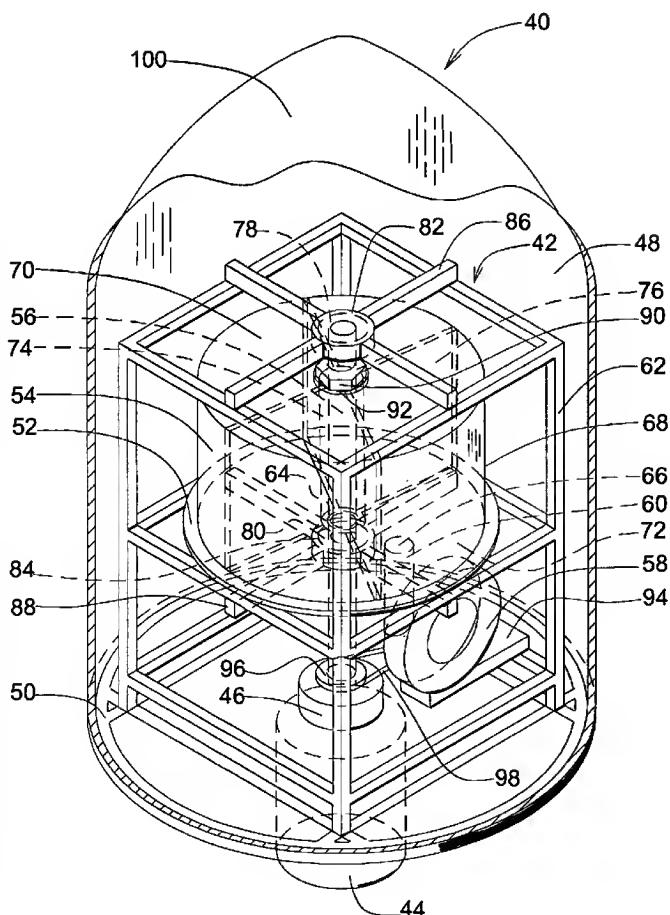
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(54) Title: MOBILE OBJECT WITH FORCE GENERATORS



(57) **Abstract:** A mobile object being a vehicle of any type includes a plurality of force generators and a plurality of engines. Each force generator (42) is a propulsion mechanism that converts directly a rotational energy of an engine (44) into a self-action force of the mobile object due to relative motion between the surfaces of its solid structure and a working gas filling a generator chamber (48) in which the force generator is installed. By controlling the direction of the shafts and angular velocities of the force generators the mobile object can accelerate momentarily in any direction in space. The enclosure of the force generators in the generator chamber makes self-action force of the mobile object independent of outer environment surrounding it. Any source of energy can be used for self-propulsion of the mobile object due to the direct conversion of the rotational energy into the self-action force.

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MOBILE OBJECT WITH FORCE GENERATORS

FIELD OF THE INVENTION

The invention relates to vehicle technology and specifically to flying objects.

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DISCUSSION OF PRIOR ART

All the recent man-made vehicles start and accelerate, speed up or slow down, with the help of either external force, or reaction force, or jet, or their combination. The vehicles are passive in relation to those forces, because the forces are external. Using the 10 external thrusts confines motion possibility of the vehicles, since the vehicles need complex structures and specific conditions for their motion. For example, aircraft needs large wings and expensive airports for lifting and landing; helicopter needs very large blades of its rotor in comparison with its body. Both of them cannot fly at very high altitude because of decreasing of the air density along the altitude of the atmosphere.

15 Spaceship needs an expensive starting complex and cannot accelerate any more after running out of fuel for jet propulsion. Therefore, the maximum speed of the man-made spaceships is very small in comparison with the light speed. On the earth surface ship needs sufficiently deep water to move, submarine cannot dive down too deep because of water pressure, automobile needs motorways, train needs railways, etc. Consequently, the 20 mankind's transport systems are very complicated, expensive, and constrained, and have low safety.

All the man-made vehicles are passive because their motion is based on Newton's laws of motion, in accordance with that the total of internal forces of each vehicle must be zero. However, the laws are stated only for solid bodies or systems of rigid particles 25 and the total internal force may differ from zero for some bodies of other nature. For example, the sum of internal forces of a moving charged particle can differ from zero, although the sum is rather small. So far there has been virtually no exploration of any other body, which can generate a sufficiently large total internal force for practical application in vehicle technology.

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OBJECTS AND ADVANTAGES

Accordingly, the main objects and advantages of my invention are to provide vehicles

with mechanisms which allow the vehicles to generate their own total internal force that is their self-action force for starting, accelerating, lifting, landing, and moving in any direction in the air, cosmos, and water (if it is sealed), and on any ground surface and water surface (if the lower part of its body is sealed). The vehicles will make the 5 mankind's transport system much more flexible, simple, cheap, safe, and faster in both the earth's environment and universe.

The above and another objects, advantages and features of my invention will become apparent following examination of drawings and ensuing description herein:

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic isometric view of a mobile object equipped with a force generator with a fragment of the shell of a generator chamber removed to show the arrangement of components of the force generator inside the generator chamber.

FIG. 2 is a side schematic view of the mobile object of FIG. 1 with the shell of the 15 generator chamber removed.

FIG. 3 is a schematic plan view of a disk-stator of the force generator of the mobile object of FIG. 1.

FIG. 4 is a schematic perspective view of a rotor of the force generator of the mobile object of FIG. 1.

20 FIG. 5 is a diagram of relative position of the solid surfaces inside the mobile object of FIG. 1 with respective labels of the pressure distributions acting on them.

FIG. 6 is a diagram of the pressure distributions over the surfaces of the top disk of the rotor of FIG. 4 and the disk-stator of FIG. 3.

FIG. 7 is a schematic perspective view of a modification of the rotor of FIG. 4.

25 FIG. 8 is a schematic perspective view of a modification of the disk-stator of FIG. 3.

FIG. 9 is a top plan view of a modification of the mutual pair of the rotor of FIG. 4 and the disk-stator of FIG. 3.

FIG. 10 is a schematic sectional view of the mutual pair of the rotor and the stator of FIG. 9 taken on line 10-10.

30 FIG. 11 is a schematic perspective view of an alternative mutual pair of rotor and stator.

FIG. 12 is the shape of dividing walls of the mutual pair of rotor and stator of FIG. 11.

FIG. 13 is a schematic perspective view of another mutual pair of rotor and stator.

FIG. 14 is the shape of dividing walls of the mutual pair of rotor and stator of FIG. 13.

FIG. 15 is a schematic side view of a ring-rotor.

FIG. 16 is a schematic top plan view of the ring-rotor of FIG. 15.

5 FIG. 17 is a schematic sectional view of the ring-rotor of FIG. 15 taken on line 17-17.

FIG. 18 is a schematic top plan view of a ring-stator.

FIG. 19 is a schematic front elevational view of an alternative force generator constructed on the base of a rotor of blades having an airfoil cross-section with a fragment of the shell of its generator chamber removed.

10 FIG. 20 is a schematic plan view of arrangement of force generators in a conventional aircraft.

FIG. 21 is a schematic side view of an aircraft with its rings removed being equipped with force generators for lifting and propulsion.

15 FIG. 22 is a schematic plan view of arrangement of the force generators in the aircraft of FIG. 21.

FIG. 23 is a schematic side view of a mobile object having a flying saucer shaped body equipped with force generators.

FIG. 24 is a schematic sectional view of the mobile object of FIG. 23 taken on line 24-24 to show a schematic plan arrangement of its force generators and power devices.

20 FIG. 25 is an enlarged schematic side view of a turntable supporting force generators.

FIG. 26 is a schematic side view of an alternative mobile object equipped with force generators.

Fig. 27 is a schematic sectional view of the mobile object of FIG. 26 taken on line 27-27 to show a schematic plan arrangement of its force generators and power devices.

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REFERENCE NUMERALS OF DRAWINGS

40	mobile object	42	force generator
44	engine	46	gearbox
48	generator chamber	50	structural frame
30	52 disk-stator	54	rotor
	56 shaft	58	fan
	60 fan duct	62	generator frame

	64 central circular hole	66 hole
	68 circumferential tube	70 top disk
	72 open bottom	74 central tube
	76 dividing wall	78 bearing
5	80 bearing	82 bearing housing
	84 bearing housing	86 supporter
	88 supporter	90 nut
	92 washer	94 supporter
	96 pulley	98 belt
10	100 shell	102 rotor
	104 stator	106 circumferential tube
	108 top disk	110 dividing wall
	112 disk	114 circumferential tube
	116 rotor	118 stator
15	120 exterior end	122 dividing wall
	124 slit	126 circumferential tube
	128 circumferential tube	130 rotor
	132 disk-stator	134 dividing wall
	136 trapezium	138 rotor
20	140 stator	142 dividing wall
	144 curve	146 straight line
	148 ring-rotor	150 circumferential tube
	152 central tube	154 shaft tube
	156 dividing wall	158 top ring
25	160 open bottom	162 rod
	164 ring-stator	166 hole
	168 mobile object	170 rotor of blades
	172 generator chamber	174 shaft
	176 supporter	178 supporter
30	180 structural frame	182 engine
	184 gearbox	186 pump system
	188 mobile object	190 aircraft
	192 force generator	194 force generator

196	engine	197	mechanical transmission means	
198	engine	199	mechanical transmission means	
200	force generator	202	force generator	
204	engine	205	mechanical transmission means	
5	206	engine	207	mechanical transmission means
	208	mobile object	210	aircraft with its rings removed
	212	force generator	214	force generator
	216	force generator	218	force generator
	220	force generator	222	force generator
10	224	generator chamber	226	floor
	228	engine	229	mechanical transmission means
	230	engine	231	mechanical transmission means
	232	engine	233	mechanical transmission means
	234	engine	235	mechanical transmission means
15	236	engine	237	mechanical transmission means
	238	engine	239	mechanical transmission means
	240	rudder	242	cockpit
	244	mobile object	246	flying saucer shaped body
	248	passenger cabin	250	machine cabin
20	252	generator chamber	254	cockpit
	256	structural frame	258	floor
	260	ladder	262	door
	264	window	266	suspension pier
	268	wheel	270	photovoltaic panels
25	272	force generator	274	force generator
	276	force generator	278	force generator
	280	force generator	282	force generator
	284	engine	285	selectively disengaging means
	286	electrical motor	287	selectively disengaging means
30	288	mechanical transmission means	290	engine
	291	selectively disengaging means	292	electrical motor
	293	selectively disengaging means	294	mechanical transmission means

296 engine	297 selectively disengaging means
298 electrical motor	299 selectively disengaging means
300 mechanical transmission means	302 engine
303 selectively disengaging means	304 electrical motor
5 305 selectively disengaging means	306 mechanical transmission means
308 engine	309 selectively disengaging means
310 electrical motor	311 selectively disengaging means
312 mechanical transmission means	314 auxiliary power unit
316 pump system	318 special gateway
10 320 turntable	322 control motor
324 turning supporter	326 structural supporter
328 gearwheel	330 small gearwheel
332 hole	334 cylindrical shaft
336 bearing	338 bore
15 340 shaft	342 clutch
343 shaft	344 control unit
345 fuel tank	346 mobile object
348 body of aerodynamic shape	350 pilot cabin
352 machine cabin	354 rudder
20 356 structural frame	358 floor
360 lower section of a floor	362 glass screen
364 door	366 suspension pier
368 wheel	370 force generator
372 force generator	374 engine
25 376 mechanical transmission means	378 engine
380 mechanical transmission means	382 rectangular frame
384 shaft	386 strut
388 strut	390 hydraulic jack
392 hydraulic jack	398 engine
30 400 mechanical transmission means	402 control unit
404 fuel tank	

SUMMARY OF THE PRINCIPLES OF THE INVENTION

In the present invention mobile objects including all types of vehicles generate their self-action force for self-propulsion due to equipping with a new invented mechanism that is called a force generator.

5 Each force generator is a propulsion mechanism that converts directly a rotational energy of an engine into self-action force of a mobile object containing the propulsion mechanism due to relative motion between the surfaces of its solid structure and a working gas filling a generator chamber in which the force generator is installed.

The force generator comprises, in combination, a mutual pair of a rotor and a stator, 10 generator frame, and a compensating gas means. The rotor includes a shaft, a shell, and a plurality of dividing walls. The shaft has bearing supporters being secured to the generator frame. The dividing walls extend from the shaft and an upper part of the surface swept by the edges of the dividing walls due to their rotation about the axis of the shaft is covered by the shell. The surface swept by the uncovered part of the edges of the 15 dividing walls due to their rotation about the axis of the shaft forms an open rotary surface of the rotor. The stator is a rigid member and has a fitting surface, which is a part of the surface of the stator that fits the open rotary surface of the rotor. The stator is secured to the generator frame and located under the rotor. The clearance between the open rotary surface and the fitting surface is such small that the space bounded by the 20 rotor and the stator is divided into separate sections rotating about the axis of the shaft and the uncovered part of the edges of the dividing walls skims the fitting surface of the stator to accompany the working gas filling said space during rotation of the rotor.

Whereby the working gas filling said space rotates together with the rotor and sweeps 25 over the fitting surface of the stator during rotation of the rotor. That results in a difference in pressure distribution over the lower and upper surfaces of the shell of the rotor and a difference in pressure distribution over the lower and upper surfaces of the stator during rotation of the rotor. The total force obtained by the differences in pressure distribution is the force generated by the force generator. That force acts on a mobile object equipped with the force generator through the shaft, mechanical joints, fasteners, 30 supporters, and generator frame of the force generator in the upward direction along the shaft of the rotor. The force generated by the force generator depends on the properties (pressure, temperature, density) of the working gas filling the generator chamber. The

compensating gas means serves for pumping into said space the amount of the working gas that compensates the amount of the working gas exhausted out of said space due to the centrifugal force.

The force generated by the force generator is the internal force of the mobile object,
5 since it is defined only by interaction between the surfaces of the solid structure and the flows of the working gas inside the mobile object. Therefore, the force generated by the force generator is the self-action force of the mobile object and does not depend on the outer environment surrounding the mobile object.

In general, each mobile object can be equipped with a plurality of the force generators
10 and the total of the internal forces generated by the force generators is its self-action force. The direction of the force generated by each of the force generators is defined by the direction of its shaft in depending on its installation. For example, the force generator may be vertically mounted (with shaft in vertical direction), horizontally mounted (with shaft in horizontal direction), or mounted at any angle (with shaft under an angle relative
15 to the horizontal plane), etc. The direction of the shaft can be also controlled by a control means. Therefore, a mobile object equipped with the force generators can accelerate in any direction and implement any maneuver by controlling the force generated by each force generator (or its angular velocity) and the direction of its shaft. Since the force generators can be mounted inside each mobile object, the mobile object can start,
20 accelerate, lift, land, and move in any direction in the air, cosmos, and water (if it is sealed) and on any ground surface and water surface (if the lower part of its body is sealed).

DETAILED DESCRIPTION OF THE INVENTION

25 Referring now to the drawings, a mobile object constructed in accordance with one embodiment of the present invention is indicated generally at **40** in FIG. 1. Mobile object **40** includes a force generator indicated generally at **42**, an engine **44**, a gearbox **46**, a generator chamber **48**, and a structural frame **50**. Force generator **42** comprises (see also FIG. 2) a disk-stator **52**, a rotor **54**, a shaft **56** of the rotor, a fan **58**, a fan duct **60**, and a
30 generator frame **62**. Disk-stator **52** (see also FIG. 3) is a disk having a central circular hole **64** as a free space for assembly of the disk-stator and the shaft, and a hole **66** being the outlet of fan duct **60**. Rotor **54** comprises (see also FIG. 4) a circumferential tube **68**

having its upper end closed by a top disk 70, an open bottom 72, a central tube 74 for the shaft assembly, and dividing walls 76. Dividing walls 76 extend from central tube 74 to circumferential tube 68 and from top disk 70 to open bottom 72 so that dividing walls 76 together with central tube 74 divide the inner space of rotor 54 into separate sections.

- 5 Shaft 56 is supported by bearings 78 and 80 arranged in bearing housings 82 and 84 respectively. The bearing housings 82 and 84 are secured to supporters 86 and 88 respectively. Disk-stator 52 and supporters 86 and 88 are secured to generator frame 62 of the force generator by screws or other suitable fasteners. Rotor 54 is mounted on shaft 56 and is secured by a nut 90 with a washer 92 on its top. Fan 58 is mounted to a
- 10 supporter 94 being secured to generator frame 62 (or to structural frame 50). Shaft 56 has a pulley 96 (or a gear) which together with a belt 98 (or a gear train) and a pulley (not shown) on the shaft (or a gear on the shaft) of fan 58 serves as a mechanical transmission means from shaft 56 of rotor 54 to the shaft of fan 58. Generator frame 62 of the force generator is secured to structural frame 50 of mobile object 40 by welds or other suitable
- 15 fasteners. The structure of shaft 56 provides such a position of rotor 54 that after the assembly of force generator 42 the clearance between the upper surface of disk-stator 52 and the plane of open bottom 72 of rotor 54 is as small as possible. Gearbox 46 is a mechanical transmission means from engine 44 to shaft 56. Generator chamber 48 has a shell 100 being secured to structural frame 50 by a suitable means. Generator chamber 48
- 20 is filled with a working gas, which may be the air or any other gas. Engine 44 may be of turbo-prop, prop-fan, piston engine, or other types. The engine may be also an electrical motor, particularly when the solar energy is used. Engine 44 and gearbox 46 are secured to structural frame 50 by suitable means (not shown). Engine 44 in FIG. 1 is located outside shell 100 of generator chamber 48. Engine 44 may be also situated inside
- 25 generator chamber 48. In that case the inlet and outlet passages of air flows and exhausted gases necessary for operation of the engine should be isolated from the working gas in generator chamber 48. Rotor 54 can be made of aluminum alloy, steel, composite materials, or other suitable rigid materials. It is desirable to make the rotor as light as possible for the sake of saving energy. Disk-stator 52 can be made of aluminum
- 30 alloy, steel, composite materials, or other rigid materials. Shell 100 can be made of steel or any other rigid materials, provided the shell can suffer the pressure of the working gas.

In some applications generator chamber 48 may be pressurized. In that case a means (not shown) for pressurizing the generator chamber may be powered from engine 44.

In operation, rotor 54 and fan 58 are driven from engine 44 through gearbox 46. During rotation of rotor 54 the working gas in the space bounded by disk-stator 52 and rotor 54 rotates together with the rotor and sweeps over the upper surface of disk-stator 52 due to dividing walls 76 which skim the upper surface of disk-stator 52 to accompany the working gas. Because of the centrifugal force some part of the working gas in the space bounded by disk-stator 52 and rotor 54 is exhausted through the clearance between the upper surface of disk-stator 52 and the circumference of open bottom 72 or the bottom edge of circumferential tube 68 of rotor 54. The exhausted gas is continuously compensated by the gas flows entering into the space bounded by disk-stator 52 and rotor 54 through fan duct 60 due to the operation of fan 58. The rotation of rotor 54 creates different relative gas flows over the surfaces of disk-stator 52 and rotor 54. The different relative gas flows, in turn, exert different pressures on the surfaces. As a result, the difference in pressure distribution over the lower and upper surfaces of disk-stator 52 and the difference in pressure distribution over the lower and upper surfaces of top disk 70 of rotor 54 exert forces on disk-stator 52 and rotor 54 respectively. The sum of the forces acts on mobile object 40 through the shaft, mechanical joints, fasteners, supporters, and structural frame of the mobile object in the upward direction along shaft 56 (from the lower surface to upper surface of the disk-stator or the top disk of the rotor). The sum of the forces generated by force generator 42 is the self-action force of mobile object 40, since it is the internal force of the mobile object. The detailed discovery of the self-action force of mobile object 40 generated by its force generator 42 is explained by considering the pressure distributions of the gas flows over the solid surfaces inside mobile object 40. FIG. 5 is a diagram of relative position of the solid surfaces inside mobile object 40. The letter P with a subscript denotes the pressure distribution over each solid surface. P₁ and P₂ are the pressure distributions over the upper and lower surfaces of top disk 70 of rotor 54 respectively. P₃ and P₄ are the pressure distributions over the upper and lower surfaces of disk-stator 52 respectively. P₅ and P₆ are the pressure distributions over the inside and outside surfaces of circumferential tube 68 respectively. P₇, P₈, and P₉ are the pressure distributions over the surfaces of the ceiling, floor, and wall of generator chamber 48.

respectively. Finally, we denote the static pressure in generator chamber 48 by P_0 , that is the pressure in the state when force generator 42 is at rest. It is obvious that P_7 and P_8 are almost equal to P_0 and the resultant aerodynamic forces acting on mobile object 40 from the pressure distributions P_7 and P_8 cancel each other. The resultant aerodynamic force 5 acting on mobile object 40 from the pressure distribution P_9 vanishes because of the symmetry of the pressure distribution. The resultant aerodynamic forces acting on the inside and outside surfaces of circumferential tube 68 of rotor 54 from the pressure distributions P_5 and P_6 respectively are equal to zero due to the geometric symmetry of the circumferential tube relative to the rotational axis of rotor 54. Therefore, the resultant 10 aerodynamic forces acting on mobile object 40 from the pressure distributions P_1 , P_2 , P_3 , and P_4 remain to be considered. FIG. 6 is a diagram of the pressure distributions over the upper and lower surfaces of top disk 70 (P_1 and P_2) and disk-stator 52 (P_3 and P_4). At a given angular velocity of rotor 54 the velocity at each point of the surface of top disk 70 is the angular velocity times the radius of the circle of the point's trajectory. The point's 15 velocity is also the relative velocity of the gas flow above the circle with respect to the upper surface of top disk 70. Therefore, the pressure distribution P_1 over the upper surface of top disk 70 reduces with increasing of the radius denoted by r in FIG. 6. In the figure R is the radius of circumferential tube 68. The gas in the space bounded by stator 52 and rotor 54 rotates together with the rotor due to dividing walls 76. Consequently, the 20 relative velocity of the gas flow inside rotor 54 with respect to the lower surface of top disk 70 is almost equal to (or a little greater than) zero. Therefore, the pressure distribution P_2 over the lower surface of top disk 70 is almost constant and equal to (or a little less than) the static pressure P_0 . Then the difference in pressure distribution, P_2-P_1 , between the lower and upper surfaces of top disk 70 rises along the radius r . The 25 difference in pressure, when multiplied by the area over which it acts, produces the force acting on top disk 70 or rotor 54 in the direction along the axis of the rotor from the lower surface to the upper surface of top disk 70. While the gas in the space bounded by disk-stator 52 and rotor 54 rotates together with the rotor due to dividing walls 76, disk-stator 52 is fixed. Therefore, the gas inside rotor 54 sweeps over the upper surface of 30 disk-stator 52. Then the relative velocity of the gas flow over the upper surface of disk-stator 52 increases with increasing of the radius r . Consequently, the pressure

distribution P_3 over the upper surface of disk-stator 52 reduces with increasing of the radius r . Finally, the pressure distribution P_4 over the lower surface of disk-stator 52 is almost constant and equal to the static pressure P_0 , because the disk-stator is fixed and the relative velocity of the gas flow over its lower surface is almost zero. Then the

5 difference in pressure distribution, P_4-P_3 , between the lower and upper surfaces of disk-stator 52 rises along the radius r . The difference in pressure, when multiplied by the area over which it acts, produces the force acting on disk-stator 52 in the direction along the axis of rotor 54 from the lower surface to the upper surface of disk-stator 52. The sum of the resultant aerodynamic forces created by the differences in pressure distribution,

10 (P_2-P_1) and (P_4-P_3), is the force generated by force generator 42 in the direction along the axis of rotor 54 from the lower surface to the upper surface of disk-stator 52 or top disk 70. The force is the thrust force generator 42 acts on the whole body of mobile object 40 through its shaft, mechanical joints, fasteners, supporters, and the structural frame of the mobile object in the upward direction along the axis of shaft 56. The force generated by

15 force generator 42 is the internal force of mobile object 40, since it is defined only by interaction between the surfaces of the solid structure and the flows of the working gas inside the mobile object, that is the generated force is the self-action force of mobile object 40 and does not depend on the outer environment surrounding the mobile object.

The discovery of the self-action force of mobile object 40 is explained by the

20 distinction in nature between mobile object 40 and solid bodies. It is known that Newton's laws are stated for (absolutely) solid bodies or systems of rigid particles. While mobile object 40 is a solid-fluid body, which is a solid body enclosing fluid flows in its inside space. For the solid-fluid body Newton's third law is applied to individual fluid particles during their collision with the solid surfaces inside the solid-fluid body. The

25 reaction forces of the solid surfaces acting on the particles colliding with them cannot be added together to get a total, since the particles are individual. Therefore, the reaction forces influence the fluid flows only by the diffusion of the momentum of the colliding particles. The momentum diffusion, in turn, affects the behavior of the fluid flows inside the solid-fluid body. However, the total force of the fluid flows acting on the solid

30 surfaces inside the solid-fluid body has been obtained from the pressure distributions on all the solid surfaces. This means that the effect of the diffusion of the momentum of the colliding particles on the fluid flows has been already accounted in receiving the total

force. The self-action force of the mobile object can be approximately calculated by the theory of inviscid compressible flow for the case of ideal implementation (the exhausted gas is being compensated momentarily). In accordance with the theory the self-action force is proportional to the static pressure P_0 , proportional to about square of the angular velocity and to about fourfold power of the radius of rotor 54. For example, with the working gas being the air the self-action force generated by the force generator of 0.5 meter radius at the pressure 101,000N/m² (the pressure of the air at sea level) is about 8,000N (Newtons) at velocity 2,500r/m (rounds per minute) and about 29,000N at velocity 5,000r/m; The self-action force generated by the force generator of 1 meter radius at the pressure 101,000N/m² is about 119,000N at velocity 2,500r/m and about 370,000N at velocity 5,000r/m. Therefore, the self-action force of the force generator of a sufficiently small radius can get a large value at a sufficiently low angular velocity. The large value of the self-action force is achieved due to the special structure of the force generator, which gives almost the maximum differences in pressure distribution over the lower and upper surfaces of top disk 70 and disk-stator 52.

If mobile object 40 operates in the atmosphere and the working gas is the air at the atmospheric pressure, the earth's atmosphere can serve as a generator chamber of mobile object 40. In that case shell 100 may be removed or the generator chamber needs not to be pressurized. In FIGS. 1 and 4 rotor 54 has four dividing walls. In general, the number of dividing walls of the rotor may be chosen arbitrary from the conditions of the strength and dynamic balance of the rotor. In FIGS. 1 and 2 force generator 42 has one fan in a fan duct. In general, the number of fans and, therefore, fan ducts, may be chosen arbitrary, provided they provide sufficient and almost momentary compensation of the exhausted gas. In FIG. 1 and 2 central tube 74 serves as an assembling member for assembly of shaft 56. The central tube may be not necessary if dividing walls 76 extend directly from the shaft. Fan 58 in fan duct 60 is a compensating gas means for pumping the working gas into the space bounded by rotor 54 and disk-stator 52 to compensate the amount of the working gas exhausted out of that space due to the centrifugal force. For speeding the compensation process a compressor may be used instead of the fan in the fan duct. In some applications a hole through the disk-stator may be used as a compensating gas means. In that case the gas is sucked into the interior space of the rotor through the hole by natural way. Shaft 56 of rotor 54 of mobile object 40 shown in FIG. 1

is supported by bearing arrangement in both sides of the rotor. They may be also supported by bearing arrangement in one side of the rotor.

From the above consideration of operation of mobile object 40 we notice that rotor 54 and disk-stator 52 constitute a mutual pair in the meaning of their geometric structure.

- 5 The basic feature of the geometric structure of the mutual pair of rotor 54 and stator 52 is the division of the space bounded by the rotor and disk-stator into separate sections such that the separate sections rotate together with rotor 54 and the uncovered lower edges of dividing walls 76 skim the upper surface of disk-stator 52. The mutual structure of rotor 54 and stator 52 makes the working gas in the space bounded by the rotor and stator
- 10 rotate together with rotor 54 and sweep over the upper surface of disk-stator 52. In other words, in the mutual structure the rotor is an accompanying gas means for accompanying a gas volume sweep over a part of the surface of the disk-stator. Therefore, the geometric structure of the mutual pair of the rotor and disk-stator can be modified provided they have the basic feature of the geometric structure. For example, the mutual pair of rotor 54
- 15 and disk-stator 52 may be replaced by the mutual pair of a rotor 102 and a stator 104 illustrated in FIGS. 7 and 8 respectively. In FIG. 7 rotor 102 has a circumferential tube 106, a top disk 108 and dividing walls 110. In FIG. 8 stator 104 has a disk 112 and a circumferential tube 114. Rotor 102 differs from rotor 54 by removing a lower part of circumferential tube 68, i.e. rotor 102 has circumferential tube 106 being shorter than
- 20 circumferential tube 68. Stator 104 differs from disk-stator 52 by adding circumferential tube 114 to the upper surface of the disk-stator such that the added circumferential tube 114 fits the removed lower part of circumferential tube 68. FIGS. 9 and 10 illustrate another mutual pair of a rotor 116 and stator 118. Rotor 116 differs from rotor 54 by removing an exterior end 120 of the lower part of dividing walls 122 to create a slit 124
- 25 between a circumferential tube 126 and each of dividing walls 122. Stator 118 differs from disk-stator 52 by adding a circumferential tube 128 such that the added tube 128 fits slit 124.

- 30 From the illustrated above pairs of rotor and stator we notice that each pair of a rotor and a stator can be constructed by the following way. The rotor includes a shaft, a shell, and a plurality of dividing walls. The shaft has bearing supporters being secured to the generator frame. The dividing walls extend from the shaft and an upper part of the surface swept by the edges of the dividing walls due to their rotation about the axis of the

shaft is covered by the shell (the upper part may include the full outer edges of the dividing wall and even a part of the bottom edges). The shaft may be separate and the rotor has an assembling member for assembly of the shaft. The surface swept by the uncovered part of the edges of the dividing walls due to their rotation about the axis of the shaft forms an open rotary surface of the rotor. The stator is a rigid member and has a fitting surface, which is a part of the surface of the stator that fits the open rotary surface of the rotor. The stator is secured to the generator frame and located under the rotor. The clearance between the open rotary surface of the rotor and the fitting surface of the stator is such small that the space bounded by the rotor and stator is divided into separate sections rotating about the axis of the shaft and the uncovered part of the edges of the dividing walls skims the fitting surface of the stator to accompany the working gas filling the space bounded by the rotor and the stator during rotation of the rotor. Whereby the working gas filling the space bounded by the rotor and the stator rotates together with the rotor and sweeps over the fitting surface of the stator during rotation of the rotor. For example, in the mutual pair of rotor 102 and stator 104 illustrated in FIGS. 7 and 8 each dividing wall 110 has a form of a rectangular plate. The shell includes circumferential tube 106 covering an upper part of the outer edges of the dividing walls and top disk 108 covering the upper end of circumferential tube 106 or the top edges of dividing walls 110. The remained uncovered part of the surface obtained by rotation of each dividing wall 110 about the axis of the shaft of rotor 102 is the open rotary surface of rotor 102. The interior surface of circumferential tube 114 and the part of the upper surface of disk 112 bounded by the bottom circumference of circumferential tube 114 constitute the fitting surface of stator 104 that fits the open rotary surface of rotor 102. During rotation of rotor 102 the uncovered part of the edges of dividing walls 110 skims the fitting surface of stator 104. For the other example, in the mutual pair of rotor 116 and stator 118 illustrated in FIGS. 9 and 10 the shell of rotor 116 also covers only an upper part of the edges of dividing walls 122, since slit 124 exists between the remained uncovered part of the edges of the dividing walls and the lower part of circumferential tube 126. Therefore, the open rotary surface of rotor 116 consists of the part of the surface swept by exterior edge 120 of the lower uncovered part of each dividing wall 122 due to its rotation about the axis of rotor 116 and the uncovered bottom surface of the rotor. Then the fitting surface of stator 118 consists of the interior surface of circumferential tube 128 and the

part of the upper surface of the disk of the stator bounded by the bottom circumference of circumferential tube 128. We notice that the geometric shape of each mutual pair of a rotor and a stator is defined by the form of dividing walls of the rotor. FIG. 11 illustrates the geometric shape of the mutual pair of a rotor 130 and a disk-stator 132, which is 5 defined by dividing walls 134 having the form of a trapezium 136 shown in FIG. 12. FIG. 13 illustrates the geometric shape of the mutual pair of a rotor 138 and a stator 140, which is defined by dividing walls 142 having the form consisting of a curve 144 and a straight line 146 shown in FIG. 14.

In FIG. 6 we see that the difference in pressure on the surfaces at small radius is much 10 smaller than that at large radius. Therefore, if the radius of a rotor is very large the central tube of the rotor may be made with a large radius too. In that case the hole of the central tube for the shaft assembly may be made shorter in order to reduce the weight of the rotor. Then the rotor has a ring cross-section. FIGS. 15 and 16 illustrate a schematic side view and a schematic top plan view of a ring-rotor 148, which is a modification of the 15 rotor shown in FIG. 4. The cross-section perpendicular to the shaft of rotor 148 has a ring shape shown in FIG. 17. In the figures ring-rotor 148 has a circumferential tube 150, a central tube 152, a shaft tube 154 for the shaft assembly, dividing walls 156, a top ring 158 and an open bottom 160. Dividing walls 156 extend from central tube 152 to circumferential tube 150 and from top ring 158 to open bottom 160. Thus dividing walls 20 156 divide the space bounded by circumferential tube 150 and central tube 152 into separate sections. Central tube 152 is secured to shaft tube 154 by rods 162. A ring-stator 164 shown in FIG. 18 together with ring-rotor 148 constitute their mutual pair. Ring-stator 164 has also a hole 166 for the outlet opening of a compensating gas means.

We notice that if disk-stator 52 of force generator 42 of mobile object 40 of FIG. 1 is 25 removed, the difference in pressure distribution over the lower and upper surfaces of top disk 70 of rotor 54 still exists. Therefore, if generator chamber 48 is high enough such that the pressures at its ceiling and floor remain almost equal to the static pressure P_0 during rotation of rotor 54 with disk-stator 52 removed, mobile object 40 still generates its self-action force. Of course the force generated by the rotor with the stator removed is too 30 much smaller than the force generated by the force generator with the mutual pair the rotor and stator. The situation remains true for other types of rotor. Nevertheless, one special case is very interesting and useful. In that case a rotor of blades having an airfoil

cross-section and being installed in a pressurized chamber can be used as a force generator.

Fig. 19 illustrates a mobile object, indicated generally at 168, with a rotor of blades 170 having an airfoil cross-section and being installed in a pressurized generator chamber 172. Rotor of blades 170 has a shaft 174, which is supported for rotation by bearing supporters 176 and 178. Bearing supporters 176 and 178 are secured to a structural frame 180 of mobile object 168. Shaft 174 of rotor of blades 170 is operatively connected to an engine 182 by a gearbox 184. A pump system 186 supports a high pressure in generator chamber 172. Pump system 186 is powered from engine 182. Generator chamber 172 should be high enough such that the pressures at its ceiling and floor are almost equal to the static pressure during rotation of rotor of blades 170.

In operation, rotor of blades 170 is driven from engine 182 through gearbox 184. Then the aerodynamic force or the lift created by rotor 170 can get a sufficiently large value due to the high pressure in generator chamber 172 and high angular velocity of rotor 170. That force acts on the whole body of mobile object 168 through the shaft, mechanical joints, fasteners, supporters, and structural frame of the mobile object. Thus mobile object 168 generates its self-action force that also does not depend on the outer environment surrounding the mobile object. Mobile object 168 distinguishes from conventional helicopters by the independence of its self-action force from outer environment and the possibility of the operation of rotor 170 at high pressure that allows reducing the size of its blades and increasing its angular velocity.

Mobile object 40 can accompany a body or a vehicle. Then the motion direction of the vehicle can be controlled by controlling the direction of the shaft of the force generator of the mobile object. In order to cancel the reactive moment of the rotor of the force generator it is desirable to install in the generator chamber two identical force generators rotating in opposite directions. The value of the force generated by each force generator can be controlled by controlling the angular velocity of its rotor due to regulating the angular velocity of its driving engine and a brake (not shown) for braking its rotor in necessary situations. In general, each vehicle can be equipped with a plurality of the force generators and a space inside the vehicle can be used as a generator chamber of its force generators.

FIG. 20 illustrates a mobile object indicated generally at 188, which is a conventional

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aircraft equipped with the force generators for vertical take-off and landing. Mobile object 188 comprises an aircraft 190 of any type, two identical force generators 192 and 194, which are powered from engines 196 and 198 respectively. Engines 196 and 198 are mounted to the structural frame of the body of aircraft 190 outside the body thereof.

- 5 Force generators 192 and 194 are vertically (with the vertical upward direction of generated forces) mounted inside the body of aircraft 190 and rotate in opposite directions. The shafts of the rotors of force generators 192 and 194 are operatively connected to engines 196 and 198 by mechanical transmission means 197 and 199 respectively. The air inside the body of the aircraft is used as the working gas for the
- 10 force generators. Force generators 192 and 194 may be also powered from engines (not shown) of aircraft 190 if its engines are turbo-fan or turbo-prop. However, from the point of view of high safety for flying, force generators 192 and 194 are better powered from their own engines as shown in FIG. 20. Since the air inside the body of the aircraft is used as the working gas, force generators 192 and 194 and engines 196 and 198 may be
- 15 installed in any suitable location of aircraft 190.

In operation, force generators 192 and 194 are driven from engines 196 and 198 through mechanical transmission means 197 and 199 respectively. The angular velocity of engines 196 and 198, therefore and force generators 192 and 194, are controlled by a control system (not shown) mounted in the cockpit (not shown) of aircraft 190. During

- 20 take-off force generators 192 and 194 lift aircraft 190 to a necessary height before starting its horizontal motion. During flying force generators 192 and 194 may be at rest or used to increase the height of the fly if it is necessary. During landing the force generators are controlled to provide a smooth vertical landing.

Mobile object 188 may be also equipped with force generators mounted horizontally (with horizontal orientation of their axes) for propulsion. In FIG. 20 force generators 200 and 202 are identical and mounted horizontally inside aircraft 190 for propulsion of mobile object 188. Force generators 200 and 202 are powered from engines 204 and 206 respectively and rotate in opposite directions. The shafts of the rotors of force generators 200 and 202 are operatively connected to engines 204 and 206 by mechanical transmission means 205 and 207 respectively.

The use of force generators for lifting and landing of a conventional aircraft allows not only to increase its safety in flying, but also to remove its wings. If the wings of aircraft

190 are removed, mobile object 188 can fly at any altitude that does not depend on its speed. In that case either a conventional propulsion mechanism (not shown) or force generators 200 and 202 are used for propulsion.

Mobile object 188 is an aircraft of the combination of the force generator's technology 5 with the conventional technology.

FIGS. 21 and 22 illustrate an alternative mobile object indicated generally at 208, which comprises a conventional aircraft with its wings removed 210 and is equipped with force generators 212, 214, 216, 218, 220, and 222. Force generators 212, 214, 216, and 218 are vertically mounted for lifting. Force generators 212 and 214 are identical and 10 rotate in opposite directions. Force generators 216 and 218 are identical and rotate in opposite directions. Force generators 220 and 222 are identical, horizontally mounted for propulsion, and rotate in opposite directions. All the force generators 212, 214, 216, 218, 220, and 222 are installed in a generator chamber 224 located under a floor 226 of aircraft 210. The working gas in the generator chamber is the air. Force generators 212, 15 214, 216, 218, 220, and 222 are powered from engines 228, 230, 232, 234, 236, and 238 respectively. All the engines are mounted to the structural frame of the body of aircraft 210 outside the body thereof. The shafts of the rotors of force generators 212, 214, 216, 218, 220, and 222 are operatively connected to engines 228, 230, 232, 234, 236, and 238 by mechanical transmission means 229, 231, 233, 235, 237, and 239 respectively. Mobile 20 object 208 includes also a rudder 240.

In operation, force generators 212, 214, 216, 218, 220, and 222 are driven from engines 228, 230, 232, 234, 236, and 238 through mechanical transmission means 229, 231, 233, 235, 237, and 239 respectively. The angular velocities of engines 228, 230, 232, 234, 236, and 238, therefore and force generators 212, 214, 216, 218, 220, and 222 25 are controlled by a control system (not shown) mounted in a cockpit 242 of aircraft 210. Force generators 212, 214, 216, and 218 are used for lifting and landing. Force generators 220 and 222 are used for propulsion. Mobile object 208 yaws by controlling horizontally mounted force generators 220 and 222. Controlling the difference between the forces generated by force generator 220 and force generator 222 creates a necessary 30 moment to yaw mobile object 208 to the right or to the left. Mobile object 208 can also yaw by controlling rudder 240. Mobile object 208 pitches by controlling vertically

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mounted force generators **212**, **214**, **216**, and **218**. Controlling the difference between the total force generated by fore force generators **212** and **214** and the total force generated by backward force generators **216** and **218** creates a necessary moment to pitch mobile object **208** upwards or downwards. Mobile object **208** rolls by controlling vertically

5 mounted force generators **212**, **214**, **216**, and **218**. Controlling the difference between the total force generated by right force generators **212** and **216** and the total force generated by left force generators **214** and **218** creates a necessary moment to roll mobile object **208** to the right or the left. Since the air density does not influence on the operation of the force generators, mobile object **208** can fly at any altitude.

10 A mobile object being a conventional vehicle such as an automobile, a train, a ship, or a submarine can be also equipped with the force generators like the conventional aircrafts equipped with the force generators illustrated in FIGS. **20-22**. The number of equipped force generators for each vehicle is arbitrarily chosen in depending on the size and weight of the vehicle and the force each installed force generator can generate. In each vehicle

15 some force generators are horizontally mounted for propulsion and some others are vertically mounted for lifting or diving. The vertically mounted force generators in each automobile, train, or ship direct their forces upward for lifting. The vertically mounted force generators in each submarine direct their forces downward for diving. Thus the automobile, train and ship equipped with the force generators can carry heavier weight or

20 move faster. The submarine equipped the force generators can dive deeper and much easier maneuver in the depth.

FIG. **23** illustrates a mobile object, indicated generally at **244**, constructed in accordance with an alternative embodiment of the present invention. FIG. **24** is a schematic sectional view of mobile object **244** taken on line **24-24** in FIG. **23**. Mobile object **244** has a flying saucer shaped body **246** and includes a passenger cabin **248**, a machine cabin **250**, a generator chamber **252** and a cockpit **254**. The skin of body **246** is mounted to a structural frame **256**. The skin may be covered with a special protecting material for cosmos traveling. Passenger cabin **248** has a horizontal floor **258**, which behaves as a beam attached to structural frame **256** at its circumference. Machine cabin **250** has a ladder **260** for climbing up and down between cabins **248** and **250**. Passenger cabin **248** has a plurality of doors **262**, a plurality of screen windows **264**. Mobile object **244** has suspension piers **266** for standing on the ground and wheels **268**, which are able

to lower for running on the ground when it is necessary. Mobile object 244 is also provided with photovoltaic panels 270 for generation of solar electricity, which can be extended by a mechanism (not shown) mounted under the panels. Generator chamber 252 is filled with the air and pressurized and contains force generators 272, 274, 276, 278, 5 280, and 282 (see FIG. 24). All the necessary supporters of the force generators are secured to structural frame 256. The shaft of the rotor of force generator 272 is operatively connected to an engine 284 or an electrical motor 286 by a mechanical transmission means 288. Engine 284 is connected to mechanical transmission means 288 by a means 285 selectively disengaging the engine, and electrical motor 286 is connected 10 to mechanical transmission means 288 by a means 287 selectively disengaging the motor. The shaft of the rotor of force generator 274 is operatively connected to an engine 290 or an electrical motor 292 by a mechanical transmission means 294. Engine 290 is connected to mechanical transmission means 294 by a means 291 selectively disengaging the engine, and electrical motor 292 is connected to mechanical transmission means 294 15 by a means 293 selectively disengaging the motor. The shaft of the rotor of force generator 276 is operatively connected to an engine 296 or an electrical motor 298 by a mechanical transmission means 300. Engine 296 is connected to mechanical transmission means 300 by a means 297 selectively disengaging the engine, and electrical motor 298 is connected to mechanical transmission means 300 by a means 299 selectively 20 disengaging the motor. The shaft of the rotor of force generator 278 is operatively connected to an engine 302 or an electrical motor 304 by a mechanical transmission means 306. Engine 302 is connected to mechanical transmission means 306 by a means 303 selectively disengaging the engine, and electrical motor 304 is connected to mechanical transmission means 306 by a means 305 selectively disengaging the motor. 25 The shafts of the rotors of force generators 280 and 282 are operatively connected to an engine 308 or an electrical motor 310 by a mechanical transmission means 312. Engine 308 is connected to mechanical transmission means 312 by a means 309 selectively disengaging the engine, and electrical motor 310 is connected to mechanical transmission means 312 by a means 311 selectively disengaging the motor. Machine cabin 250 is also 30 equipped with an auxiliary power unit 314 and a pump system 316 for pressurization of generator chamber 252 and passenger cabin 248. There is a special gateway 318 between

machine cabin 250 and generator chamber 252. Force generators 272, 274, 276, and 278 are identical and vertically mounted for lifting. Force generators 272, 274, 276, and 278 are located at an equal distance from the central axis of the body of mobile object 244, and at an equal distance from each other. The direction of rotation of the shafts of force 5 generators 272 and 274 and the direction of rotation of the shafts of force generators 276 and 278 are opposite. Force generators 280 and 282 are identical and mounted horizontally on a turntable 320. The shafts of force generators 280 and 282 are parallel, rotate in opposite directions and their generated forces have the same direction. The axis of turntable 320 coincides with the central axis of the body of mobile object 244. This 10 means that the shafts of force generators 280 and 282 are parallel to floor 258, and the forces generated by force generators 280 and 282 have their direction perpendicular to the direction of the forces generated by force generators 272, 274, 276, and 278.

Turntable 320 can turn on its axis any angle by the help of a control motor 322. A structure of turntable 320 is shown in FIG. 25. Turntable 320 includes a turning supporter 15 324 and a structural supporter 326. Turning supporter 324 is used for securing the frames of force generators 280 and 282. Structural supporter 326 is secured to structural frame 256 and used for supporting turning supporter 324. Turning supporter 324 has a gearwheel 328 underneath, which is driven for turning by a small gearwheel 330 of a gear train (not shown) driven from control motor 322. The control motor is powered from 20 auxiliary power unit 314. Turntable 320 has a hole 332 at its center for the line of power transmission and a cylindrical shaft 334. Turning supporter 324 is supported on a suitable bearing 336 for rotation on structural supporter 326. Cylindrical shaft 334 rotates in a bore 338 of structural supporter 326. Suitable sleeve bearing may be provided in bore 338. For correct coordination of the operation of turntable 320 with the power 25 transmission from engine 308 or electrical motor 310 to force generators 280 and 282 a shaft 340 rotating in hole 332 is jointed to a clutch 342 under the turntable. The flywheel of clutch 342 is jointed to a shaft 343, which is the output of mechanical transmission means 312. A control unit 344 including all the control panels and necessary steering tools of mobile object 244 is mounted in cockpit 254. All the necessary mechanical, 30 hydraulic, and electrical transmission lines and circuits (not shown) connecting the control panels and steering tools of mobile object 244 with their objects such as the

engines, actuators, motors, turntable, clutch, control motor, wheels and their brakes are mounted suitably in machine cabin 250 and generator chamber 252. For supplying fuel to the engines fuel tanks 345 together with a system of pumps and valves (not shown) are arranged in machine cabin 250 so that the center of gravity of mobile object 244 as closer 5 to its center of gravity as possible. Mobile object 244 may be also provided with external drop fuel tanks (not shown). Hydraulic-mechanical systems (not shown) for lowering and braking wheels 268 of the mobile object are powered from auxiliary power unit 314.

In operation, force generators 272, 274, 276, and 278 are driven from engines 284, 290, 296, and 302 through mechanical transmission means 288, 294, 300, and 306 10 respectively or electrical motors 286, 292, 298, and 304 through mechanical transmission means 288, 294, 300, and 306 respectively. Force generators 280 and 282 are driven from engine 308 or electrical motor 310 through mechanical transmission means 312. The angular velocities of engines 284, 290, 296, 302, and 308 or electrical motor 286, 292, 298, 304, and 310, therefore and force generators 272, 274, 276, 278, 280, and 282 are 15 controlled by control unit 344. Force generators 272, 274, 276, and 278 lift mobile object 244 in the direction of the vertical axis of the mobile object. Force generators 280 and 282 thrust mobile object 244 in a direction perpendicular to the vertical axis of the mobile object. The instant direction of the thrusting force of force generators 280 and 282 is defined by the instant turning angle of turntable 320, which is controlled by control 20 motor 322. Then mobile object 244 can implement any translation motion in space by combination of the lifting and thrusting forces. Mobile object 244 maneuvers by controlling the forces generated by force generators 272, 274, 276, 278, 280, and 282 to create necessary moments. Mobile object 244 rolls about the axis of symmetry between the pair of force generators 272 and 274 and the pair of force generators 276 and 278 by 25 creation of the difference between the total force generated by force generators 272 and 274 and the total force generated by force generators 276 and 278. Mobile object 244 rolls about the axis of symmetry between the pair of force generators 272 and 278 and the pair of force generators 274 and 276 by creation of the difference between the total force generated by force generators 272 and 278 and the total force generated by force 30 generators 274 and 276. Mobile object 244 rolls about the axis of symmetry between force generators 272 and 276 by creation of the difference between the force generated

by force generator 272 and the force generated by force generator 276. Mobile object 244 rolls about the axis of symmetry between force generators 274 and 278 by creation of the difference between the force generated by force generator 274 and the force generated by force generator 278. Thus mobile object 244 can implement almost any maneuver in any 5 direction in space by controlling force generators 272, 274, 276, 278, 280, and 282, and turntable 320. When mobile object 244 flies at very high altitude or in cosmos, solar energy converted to electrical energy by photovoltaic panels 270 can be used for powering electrical motors 286, 292, 298, 304, and 310. Particularly, in cosmos mobile object 244 can continue accelerate by using solar energy or universe energy up to 10 desirable velocity and the fuel on board can be saved for emergencies. Since the value and direction of the self-action force can be controlled and do not depend on the air density, mobile object 244 can come out to the cosmos and return into the atmosphere smoothly.

Mobile object 244 shown in FIGS. 23 and 24 includes four vertically mounted force 15 generators and two horizontally mounted force generators. In general, the number of equipped force generators and their arrangement in the mobile object can be chosen arbitrary. That depends on the characteristics of the equipped force generators and the mass, volume, and specific functions of the mobile object. For example, if force generators 274 and 278 of mobile object 244 are removed, the lift and the possibility of 20 maneuver of the mobile object are reduced. For other example, if mobile object 244 is equipped with another additional pair of horizontally mounted force generators, the propulsion and the possibility of maneuver of the mobile object are larger. Since the forces generated by the force generators do not depend on the outer environment surrounding the mobile object, the shape of the body of the mobile object can be changed 25 as desired. In other words, the shape of each mobile object equipped with force generators may be chosen arbitrary in depending on its specific purposes.

If a mobile object equipped with the force generators flies at a low altitude near the earth surface and its volume is desired to be as small as possible for a given passenger space, the number of the equipped force generators may be reduced by adding other 30 members.

FIGS. 26 and 27 illustrate a mobile object, indicated generally at 346, which is a small vehicle flying near the earth surface and serves as a flying car. Mobile object 346 has a

body of aerodynamic shape 348 and includes a pilot cabin 350, a machine cabin 352, and a rudder 354. The skin of body 348 is secured to a structural frame 356. Pilot cabin 350 has a horizontal floor 358, which behaves also as a beam attached to structural frame 356. Floor 358 may have a lower section 360 if the pilot cabin is too small. Pilot cabin 350 has

5 a glass screen 362 for pilot vision. A door 364, which is a section of the top of the pilot cabin, has hinges (not shown) and can be closed-off for pilot climbing. Mobile object 346 has suspension piers 366 for standing on the ground and wheels 368, which are able to lower for running on the ground when it is necessary. Mobile object 346 is equipped with force generators 370 and 372 (see FIG. 27), which are arranged in machine cabin 352.

10 Thus machine cabin 352 serves also as a generator chamber, since the natural air in the atmosphere is used as a working gas for the force generators. The shaft of the rotor of force generator 370 is operatively connected to an engine 374 by a mechanical transmission means 376. The shaft of the rotor of force generator 372 is operatively connected to an engine 378 by a mechanical transmission means 380. Engines 374 and

15 378 are mounted in machine cabin 352. Force generators 370 and 372 are identical and rotate in opposite directions. Force generators 370 and 372 are vertically mounted on the upper plane of a rectangular frame 382. Frame 382 has a shaft 384, which is supported by suitable bearings (not shown) arranged in struts 386 and 388. Struts 386 and 388 are secured to structural frame 356. One of the edges of frame 382 is operatively

20 jointed with the tops of hydraulic jacks 390 and 392, which control the angle between the upper plane of rectangular frame 382 and the horizontal plane. Hydraulic jacks 390 and 392 operate by the help of a pump 394 and a hydraulic circuit 396. Pump 394 is operatively connected to an engine 398 by a mechanical transmission means 400. Hydraulic jacks 390 and 392, pump 394, hydraulic circuit 396, engine 398, and

25 mechanical transmission means 400 are secured to structural frame 356. A control unit 402 including all the control panels and necessary steering tools of mobile object 346 is mounted in the front of pilot cabin 350. Hydraulic mechanical systems (not shown) for lowering and breaking the wheels of the mobile object are powered from engine 398. A fuel tank 404 is mounted in machine cabin 352 so that the center of gravity of mobile

30 object 346 is as closer to the center of the mobile object as possible.

In operation, force generators 370 and 372 are driven from engines 374 and 378

through mechanical transmission means 376 and 380 respectively. Hydraulic jacks 390 and 392 raise or lower the edge of rectangular frame 382 jointed with their tops to give a desirable angle of the axes of force generators 370 and 372 relative to the horizontal plane. Then the total force created by force generators 370 and 372 is resolved into the

5 vertical component and horizontal component. The vertical component is the lift of mobile object 346 and the horizontal component is the propulsion of the mobile object. Thus mobile object 346 can lift, hover in the air, and fly forward or backward by controlling the operation of force generators 370 and 372 and hydraulic jacks 390 and 392. Mobile object 346 yaws by controlling rudder 354. Mobile object 346 rolls by

10 creating a difference between the lifting forces generated by force generators 370 and 372. If a lower part of the skin of body 348 is sealed, mobile object 346 can sail on water surface. Mobile object 346 runs on the ground by wheels 368. Thus mobile object 346 can take-off, hover in the mid-air, fly forward and backward, land, run on the ground, and sail on the water surface.

15 For increasing flying speed mobile object 346 may be further equipped with an additional propulsion mechanism that may be a horizontally mounted force generator (not shown) or a conventional propulsion mechanism (not shown).

From the foregoing, it will be seen that the present invention provides a new generation of vehicles. The distinguished advantage of the new vehicles is their ability to generate

20 self-action forces, which do not depend on outer environment surrounding them. The advantage is achieved by equipping the vehicles with a plurality of force generators, which are principal components of the invention. The independence from outer environment makes the vehicles universal, much more flexible, and safer, and the infrastructure for their exploitation simpler and cheaper. The advantages of the force

25 generators as propulsion mechanisms are their ability to be enclosed in any vehicle and generate very large forces from any source of energy, since any source of energy can be converted into rotational. The enclosure of the force generators makes the motion of the vehicles much more quiet than that of the conventional ones due to ability of damping noisy down to minimum.

30 An aircraft equipped with the force generators can take-off and land vertically, hover in space, fly at any altitude being independent of speed of flying, and implement flexible maneuvers. The vertical take-off and landing makes the aviation transport systems much

more flexible, simpler, safer, and cheaper.

A flying car equipped with the force generators can take-off and land vertically, hover in the mid-air, fly forward and backward, implement flexible maneuvers, run on the ground, and sail on the water surface. The size of the flying car can be made sufficiently small as an automobile. Therefore, the application of the flying car can solve the jam problem of the traffic system on the ground.

A flying saucer equipped with the force generators is a universal vehicle in the earth's atmosphere and in the cosmos. The flying saucer can accelerate in any direction, implement very complicated maneuvers, come out to the cosmos and return in to the atmosphere smoothly.

A spaceship, which may be the above flying saucer, can continue accelerate in cosmos up to desirable velocity by using the solar or universe energy.

An automobile, a train, and a ship equipped with the force generators can carry heavier loads or move faster.

15 A submarine equipped with the force generators can dive deeper and maneuver easier in the depth.

A town in cosmos can be constructed as large as desirable by using a large number of force generators.

20 Flying robots for different purposes can be made by using the force generator's technology.

Accordingly, the main objects and advantages of my invention are to provide vehicles with mechanisms which allow the vehicles to generate their self-action forces for starting, accelerating, lifting, landing, and moving in any direction in the air, cosmos, and water (if it is sealed) and on any ground surface and water surface (if the lower part of its body 25 is sealed). The vehicles will make the mankind's transport system much more flexible, simple, cheap, and faster in both the earth's environment and universe.

The foregoing description illustrates preferred embodiments of the invention. However, it will be apparent to those skilled in the art that the principles and concepts employed in such description may be employed in other embodiments without departing from the 30 scope of the invention. Accordingly, the following claims are intended to protect the invention broadly, as well as in specific forms shown herein.

CLAIMS:

I claim:

1. A force generator comprising, in combination, a stator being a rigid member, an accompanying gas means for accompanying a gas volume over a fitting surface being a part of the surface of said stator, and a generator frame, said stator being secured to said generator frame under said accompanying gas means, said accompanying gas means having supporters for motion secured to said generator frame, whereby said gas volume sweeping over said fitting surface of said stator during the motion of said accompanying gas means.
- 10 2. The force generator of claim 1 wherein said accompanying means being a rotor including a shaft, a shell, and a plurality of dividing walls, said shaft having bearing supporters being secured to said generator frame, said dividing walls extending from said shaft and an upper part of the surface swept by the edges of said dividing walls due to their rotation about the axis of said shaft being covered by said shell, the surface swept by the uncovered part of the edges of said dividing walls due to their rotation about the axis of said shaft forming an open rotary surface of said rotor, said fitting surface of said stator fitting said open rotary surface of said rotor.
3. The force generator of claim 2 wherein said shaft being separate from said rotor and assembled with said rotor by an assembling member secured to said dividing walls.
- 20 4. The force generator of claim 3 wherein said assembling member being tubular.
5. The force generator of claim 4 further including a compensating gas means for compensating the amount of gas exhausted out of the space bounded by said rotor and said stator due to the centrifugal force during rotation of said rotor.
6. The force generator of claim 5 wherein said compensating gas means being a fan in a fan duct.
- 25 7. The force generator of claim 5 wherein said compensating gas means being a compressor.
8. The force generator of claim 5 wherein said stator being a disk, each of said dividing walls being a rectangular plate, said shell covering the surface swept by the outer and top edges of said dividing walls due to their rotation about the axis of said shaft.
- 30 9. The force generator of claim 5 wherein said shell covering the surface swept by the top edges and an upper part of the outer edges of said dividing walls due to their

rotation about the axis of said shaft, said stator being a circumferential tube having a disk-bottom.

10. The force generator of claim 5 wherein each of said dividing walls being a plate having a trapezium shape.

5 **11.** A mobile object including a force generator according to claim 5 and further comprising a generator chamber, an engine, and a structural frame, said generator frame of said force generator being secured to said structural frame, said generator chamber enclosing said force generator and being filled with a gas, said engine being operatively connected to the shaft of said rotor of said force generator by a mechanical transmission
10 means to drive said rotor.

12. A conventional vehicle including a plurality of force generators according to claim 5 and further comprising a plurality of engines and a generator chamber, said generator chamber being filled with the air, some of said force generators being vertically mounted in said generator chamber, the other said force generators being horizontally
15 mounted in said generator chamber, the shaft of said rotor of each of said force generators being operatively connected to one of said engines by a mechanical transmission means to be driven from said engine.

20 **13.** A conventional aircraft including a pair of force generators according to claim 5 and further comprising two engines, said force generators being identical and rotating in opposite directions, said force generators being vertically mounted inside the body of said conventional aircraft for lifting, the shaft of said rotor of each of said force generators being operatively connected to one of said engines by a mechanical transmission means to be driven from said engine.

25 **14.** The conventional aircraft of claim 13 further including another pair of force generators according to claim 5 and two other engines, said force generators being identical and rotating in opposite directions, said force generators being horizontally mounted inside the body of said conventional aircraft for propulsion, the shaft of said rotor of each of said force generators being operatively connected to one of said engines by a mechanical transmission means to be driven from said engine.

30 **15.** A conventional aircraft with its wings removed including a plurality of pairs of force generators according to claim 5 and further comprising a plurality of engines and a generator chamber, said force generators being mounted in said generator chamber, said force generators of each said pair being identical and rotating in opposite

directions, some of said pairs of the force generators being vertically mounted for lifting, the other said pairs of the force generators being horizontally mounted for propulsion, the shaft of said rotor of each of said force generators being operatively connected to one of said engines by a mechanical transmission means to be driven from said engine.

5 16. A mobile object including a plurality of pairs of force generators according to claim 5, the force generators of each of said pairs being identical and rotating in opposite directions, said mobile object further comprising:

 a structural frame;

10 10 a flying saucer shaped body being secured to said structural frame;

 a passenger cabin having a floor being attached to said structural frame, a plurality of doors for human gateways, and a plurality of screen windows for human vision;

 a turning means;

 a control motor;

15 15 a generator chamber for mounting said force generators, said turning means, and said control motor, the force generators of one of said pairs being horizontally mounted on said turning means, said turning means being controlled by said control motor and turning said horizontally mounted force generators, the force generators of other said pairs being vertically mounted for lifting;

20 20 a plurality of engines;

 an auxiliary power unit;

 a pump system being powered from said auxiliary power unit for pressurization of said generator chamber and said passenger cabin;

 a machine cabin for mounting said engines, said auxiliary power unit, and said pump

25 25 system, the shaft of said rotor of each of said vertically mounted force generators being operatively connected to one of said engines by a mechanical transmission means to be driven from said engine, the shafts of said horizontally mounted force generators being operatively connected to one of said engines by a mechanical transmission means to be driven from said engine, each of said engines being

30 30 connected to said mechanical means by a means selectively disengaging said engine from said mechanical transmission means;

 a plurality of suspension piers allowing said mobile object to stand on the ground;

 a plurality of wheels allowing said mobile object to run on the ground;

a fuel tank being mounted in said machine cabin for providing said engines and said auxiliary power unit with fuel;

a control system being mounted in a cockpit for controlling the devices of said mobile object.

5 17. The mobile object of claim 16 further including photovoltaic panels and a plurality of electrical motors being powered from said photovoltaic panels, each of said electrical motors being connected to one of said mechanical means by a means for selectively disengaging said electrical motor from said mechanical means.

10 18. A mobile object including two force generators according to claim 5 further comprising:

a structural frame;

a body of aerodynamic shape being secured to said structural frame;

a pilot cabin having a floor attached to said structural frame, a door for human climbing, and a glass screen for human vision;

15 two engines;

a tilting means having an upper plane;

a machine cabin for mounting said force generators and said engines, said force generators being identical and vertically mounted for lifting on the upper plane of said tilting means, said force generators rotating in opposite directions, the shaft of

20 said rotor of each of said force generators being operatively connected to one of said engines by a mechanical transmission means;

a plurality of suspension piers allowing said mobile object to stand on the ground;

a plurality of wheels allowing said mobile object to run on the ground;

a fuel tank being mounted in said machine cabin for providing said engines with fuel;

25 a control unit being mounted in the front of said pilot cabin for controlling the devices of said mobile object.

19. The mobile object of claim 18 wherein said tilting means comprising a rectangular frame for securing said force generators, said rectangular frame having a shaft, said shaft having bearing supporters arranged in struts being secured to said 30 structural frame, the ends of one edge of said rectangular frame being operatively jointed with the tops of hydraulic jacks, said hydraulic jacks having a hydraulic circuit and a pump being powered from an engine mounted in said machine cabin.

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20. A mobile object comprising:
 - a structural frame;
 - a generator chamber being mounted to said structural frame and filled with a gas;
 - a shaft having bearing supporters secured to said structural frame inside said generator chamber;
 - a rotor of blades having an airfoil cross-section and being mounted on said shaft for rotation;
 - an engine being operatively connected to said shaft by a mechanical transmission means;
- 10 a pump system for pressurization of said generator chamber.

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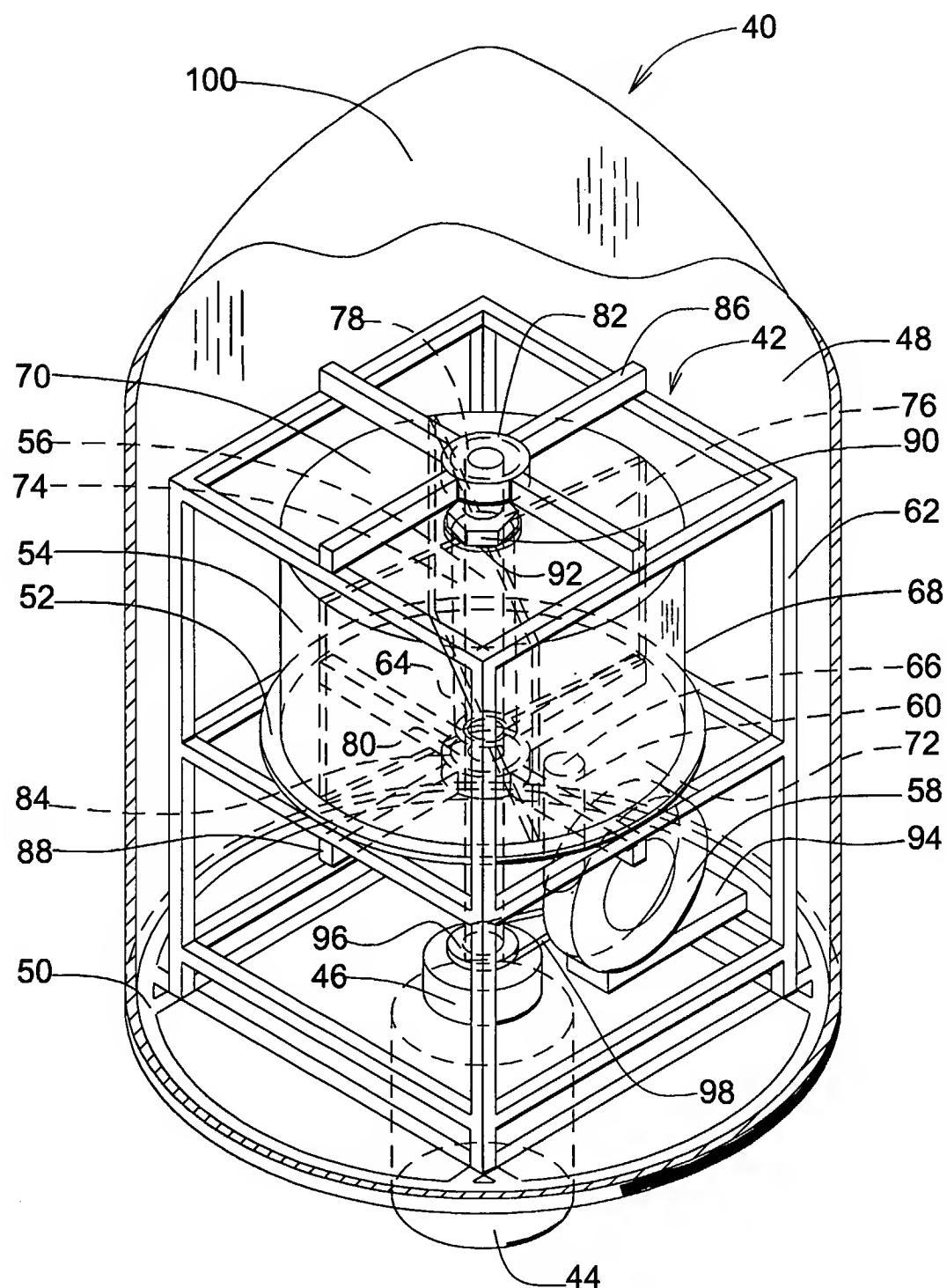


FIG. 1

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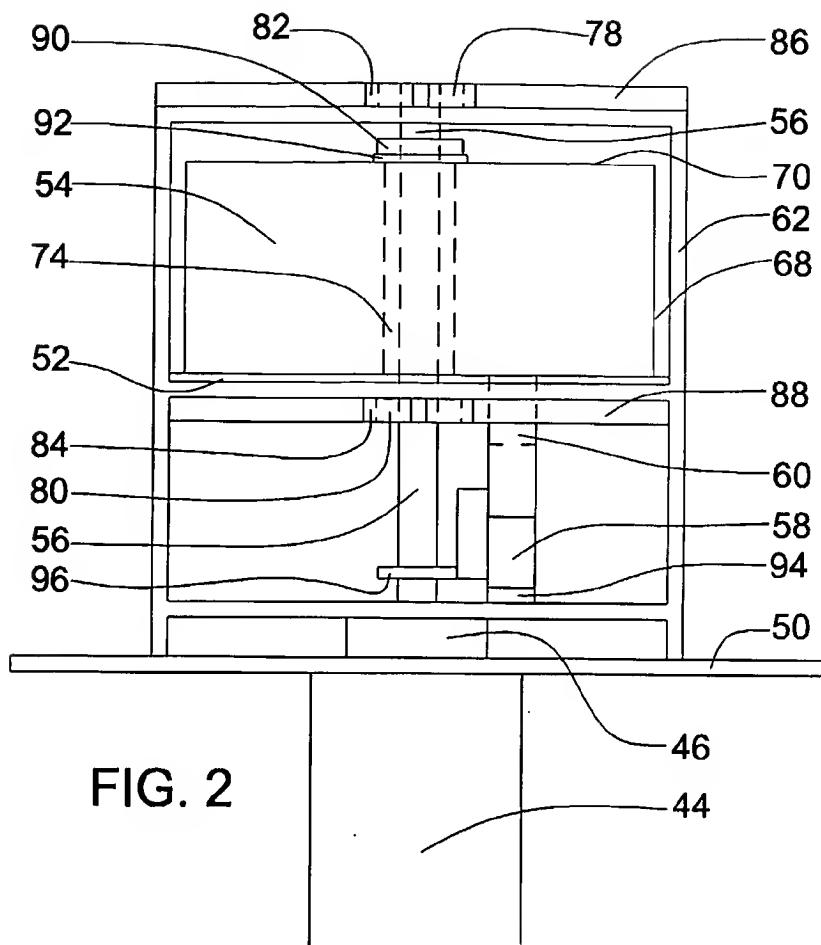


FIG. 2

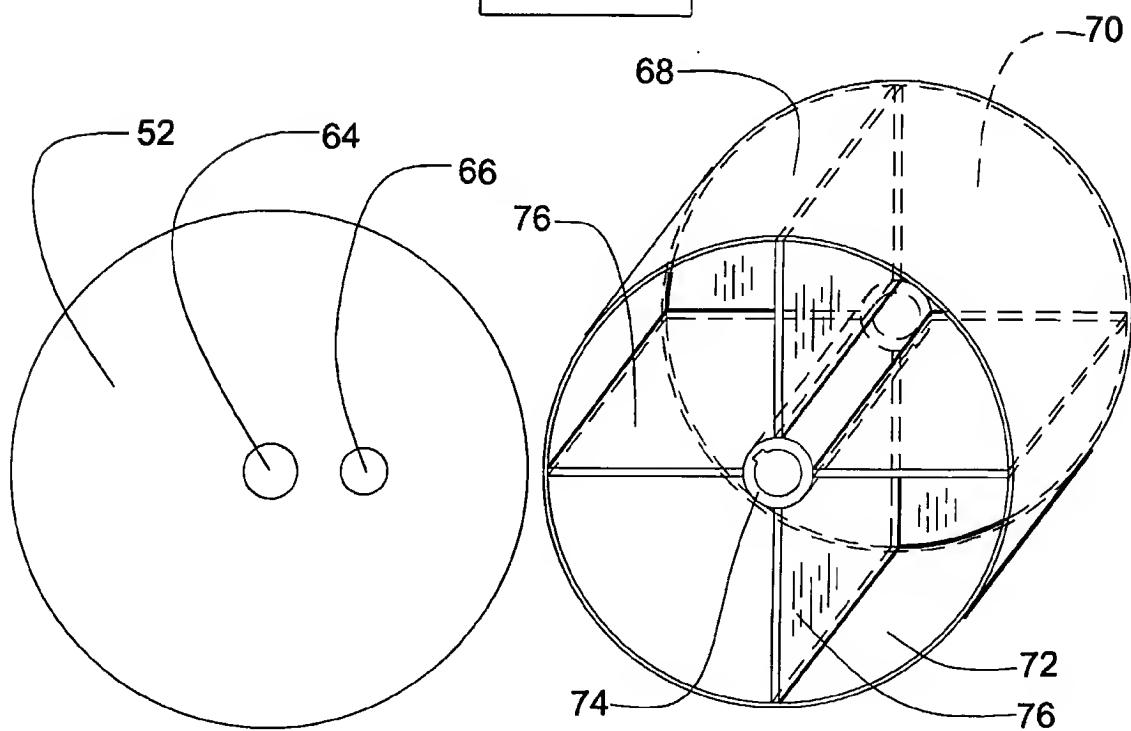


FIG. 3

FIG. 4

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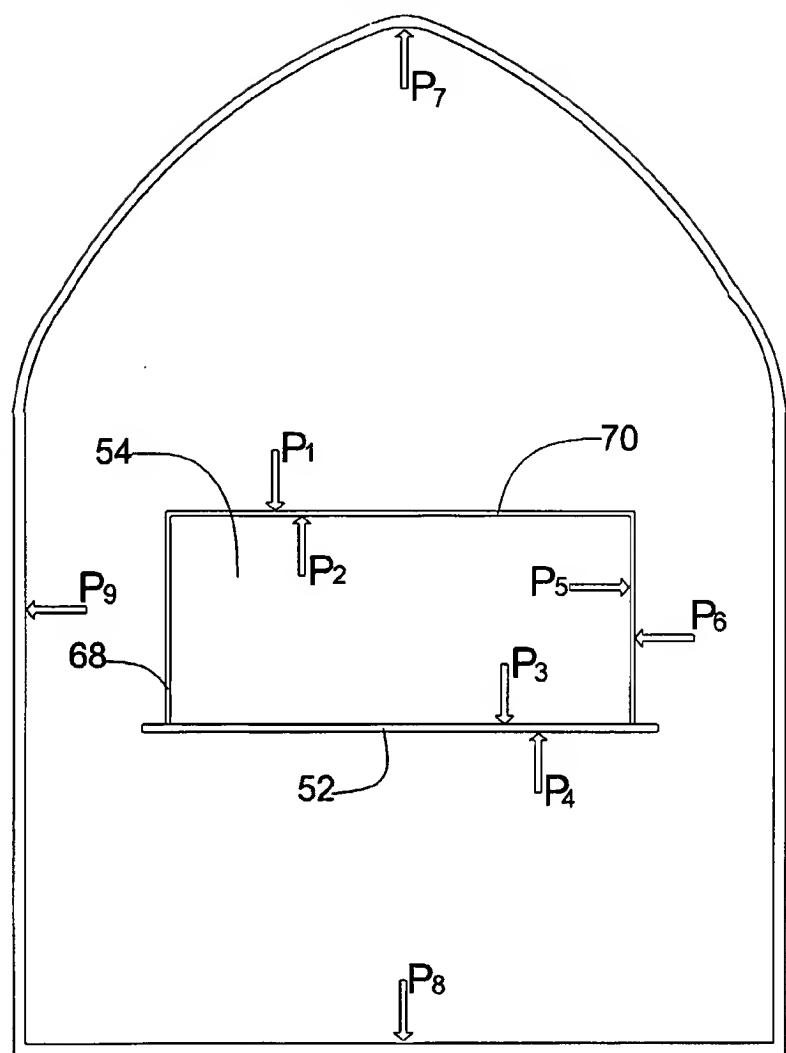
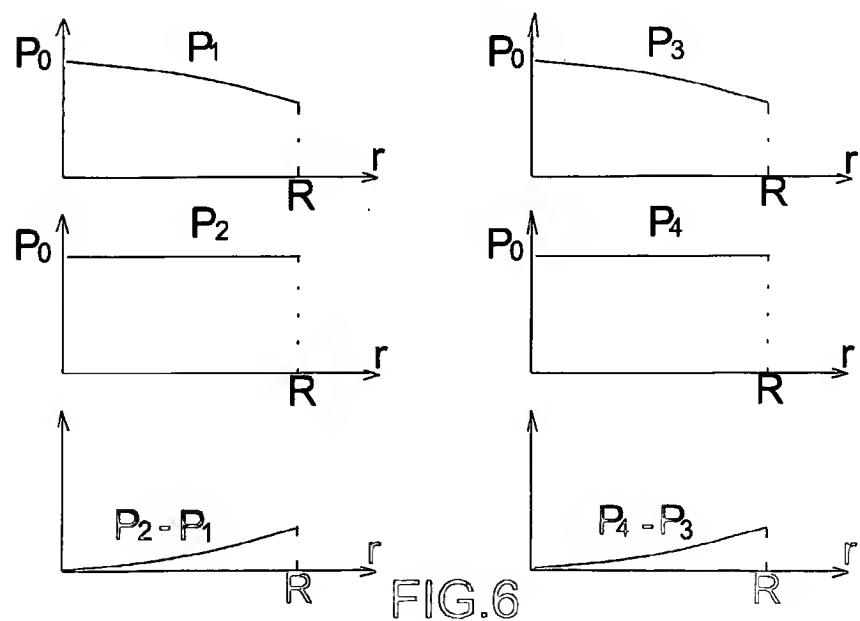


FIG. 5



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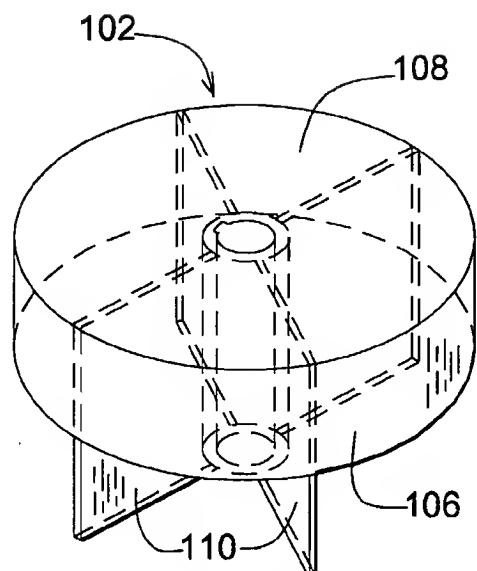


FIG. 7

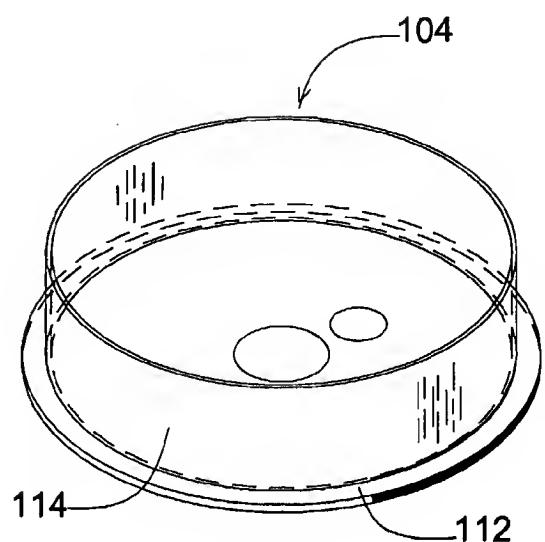


FIG. 8

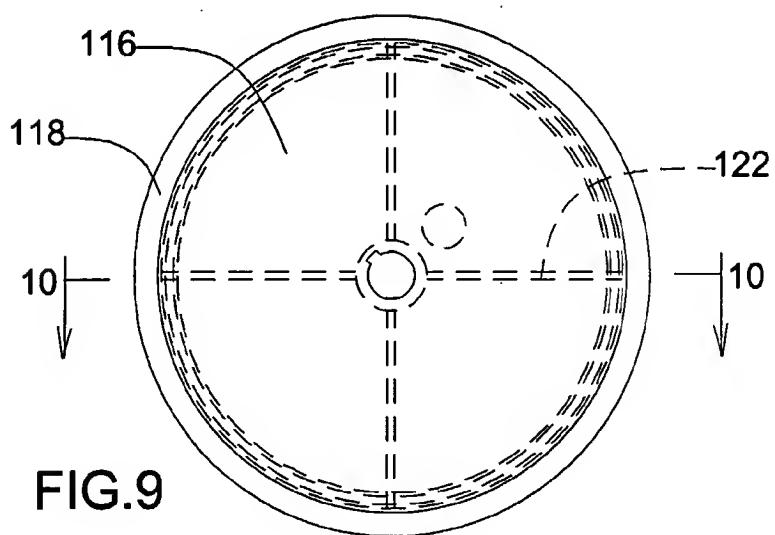


FIG. 9

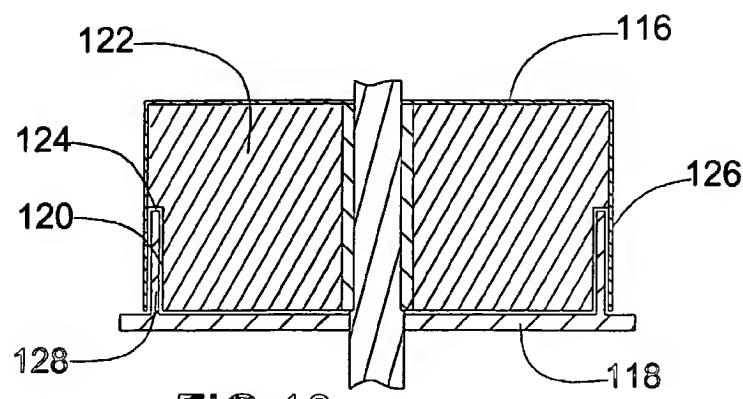


FIG. 10

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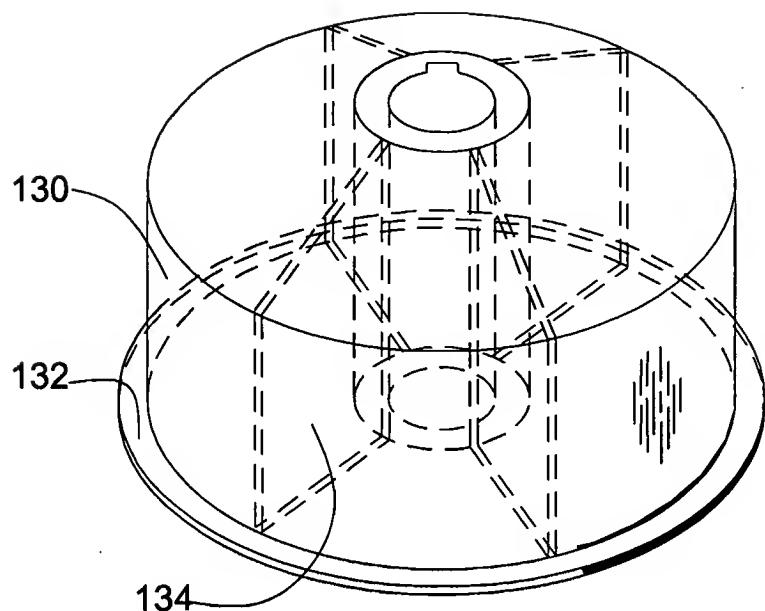


FIG.11

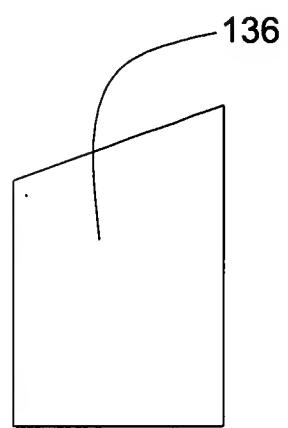


FIG.12

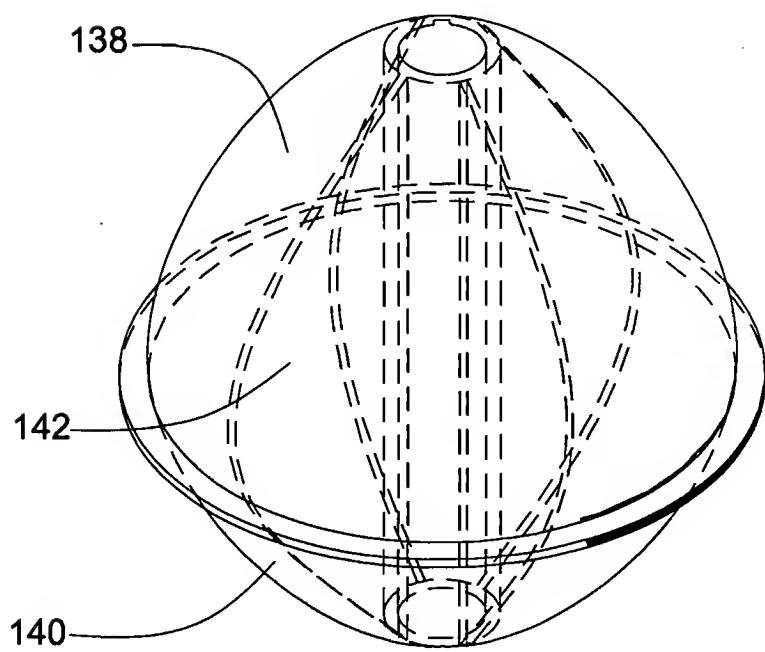


FIG.13

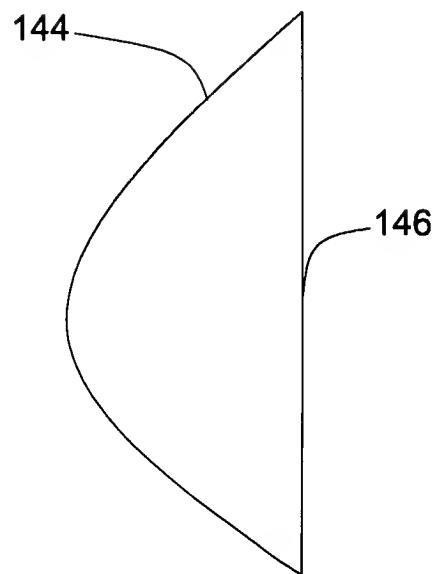
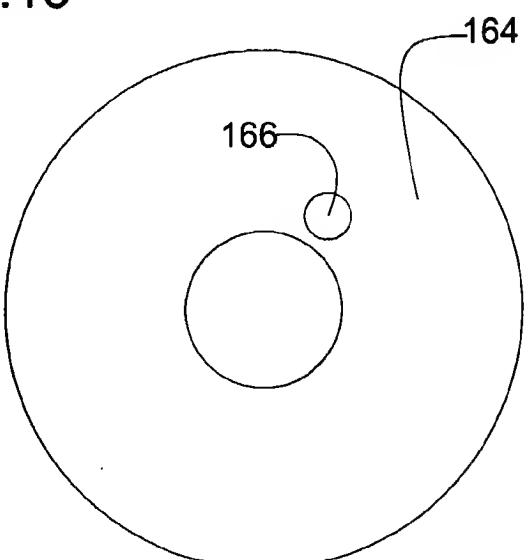
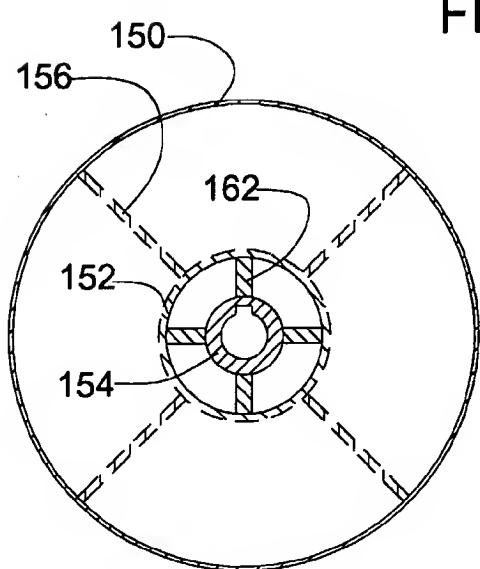
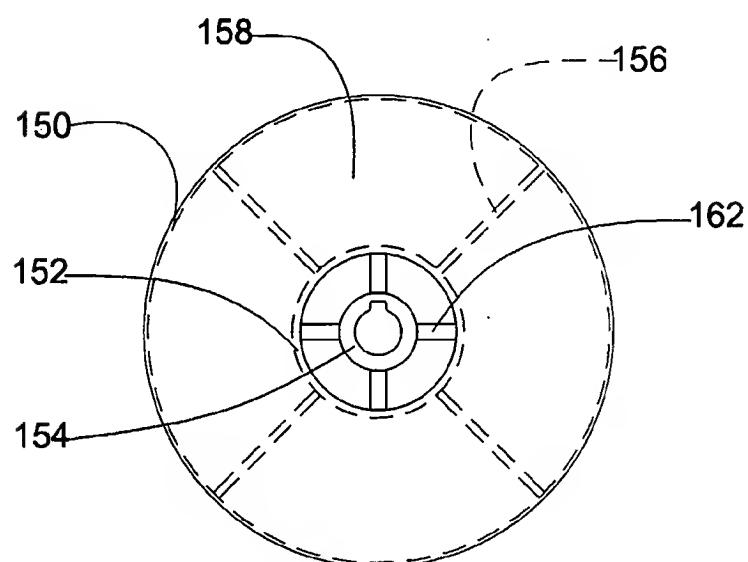
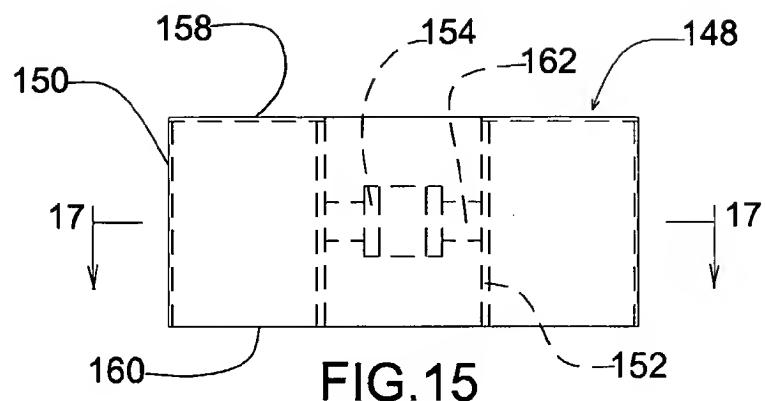
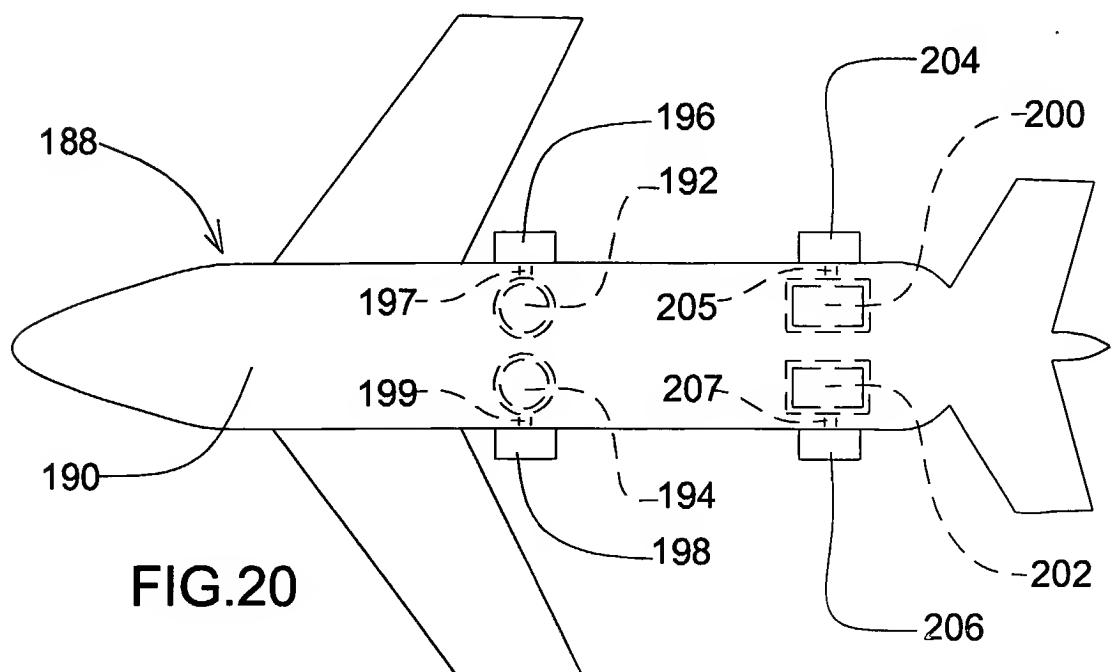
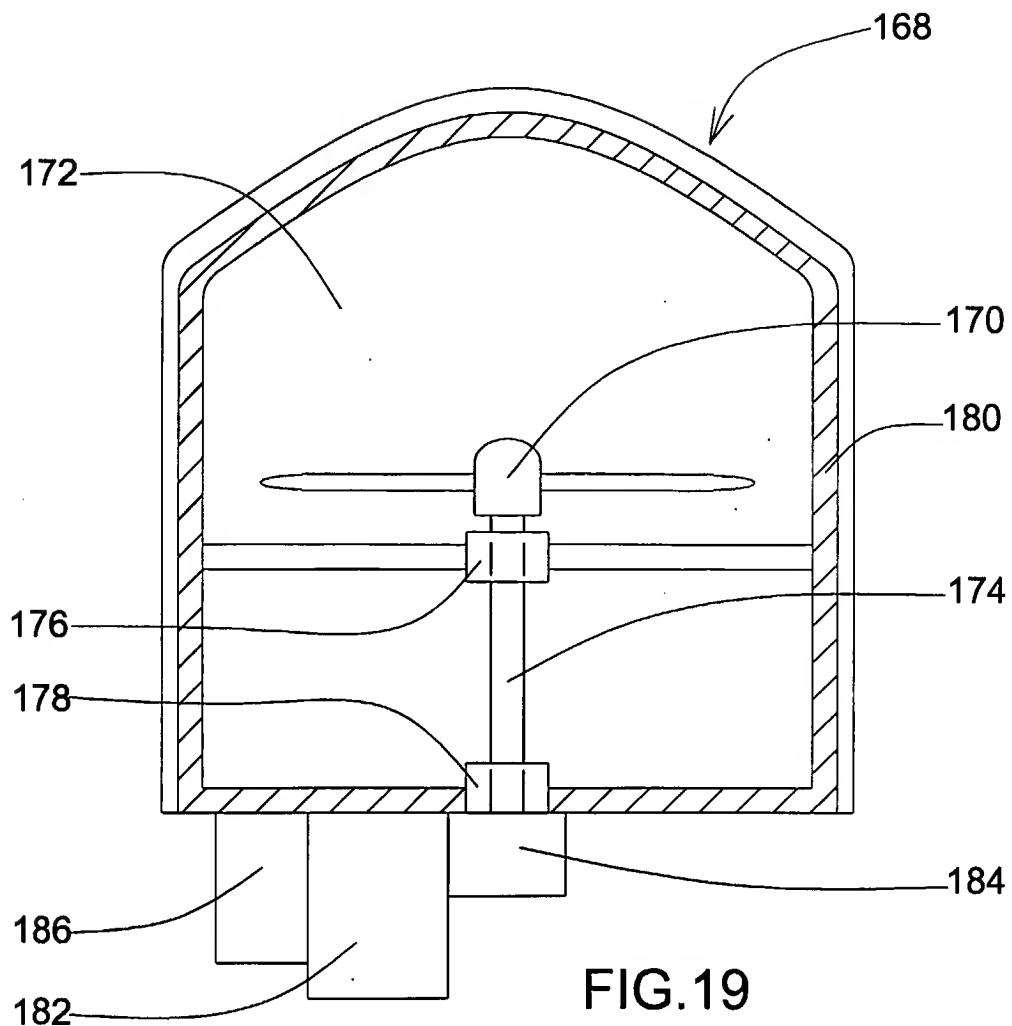


FIG.14

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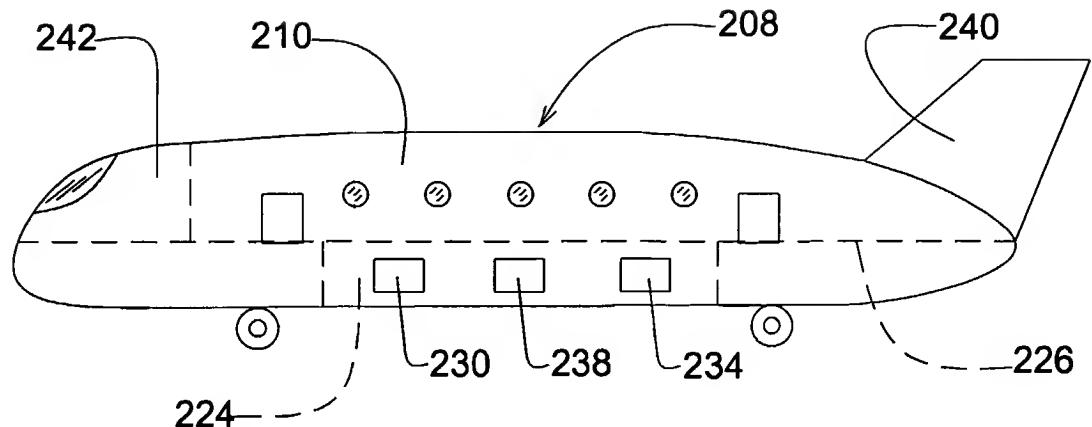


FIG.21

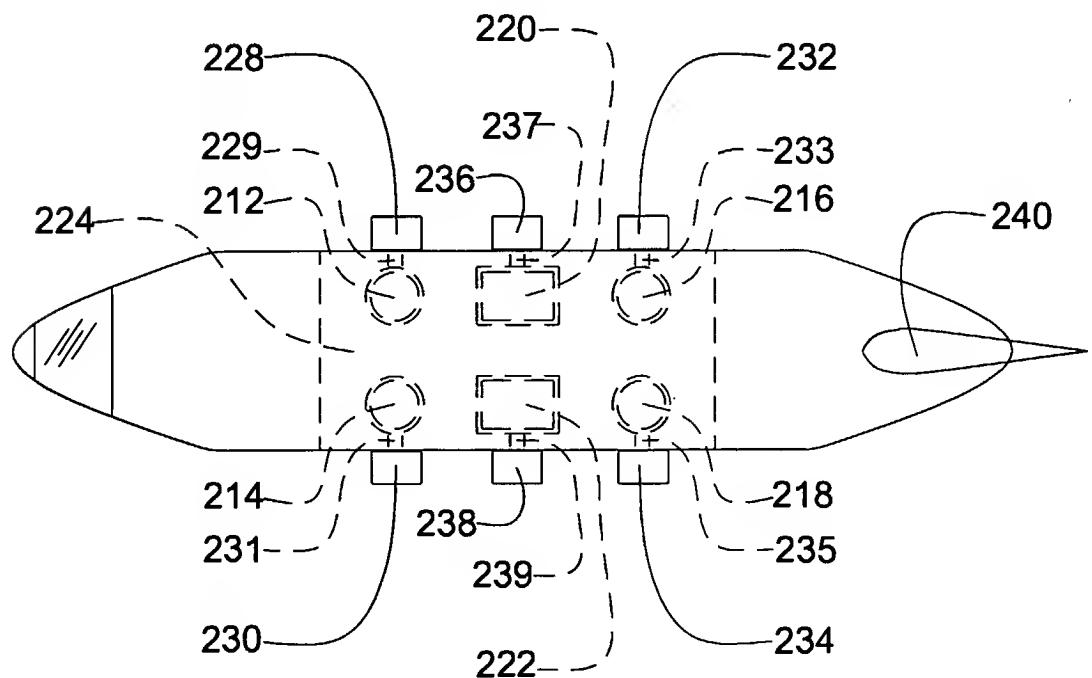


FIG.22

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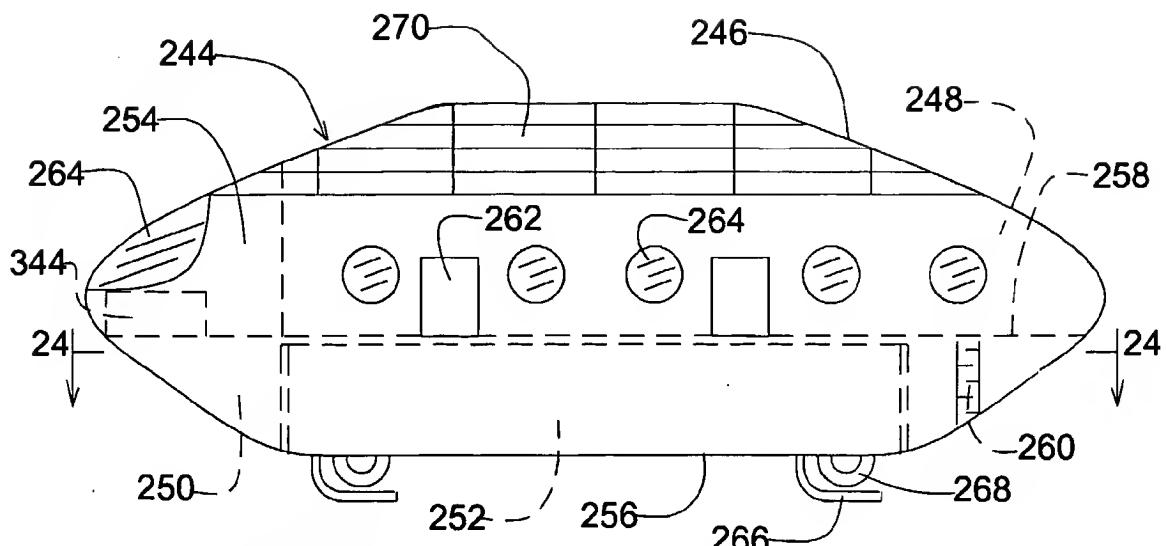


FIG.23

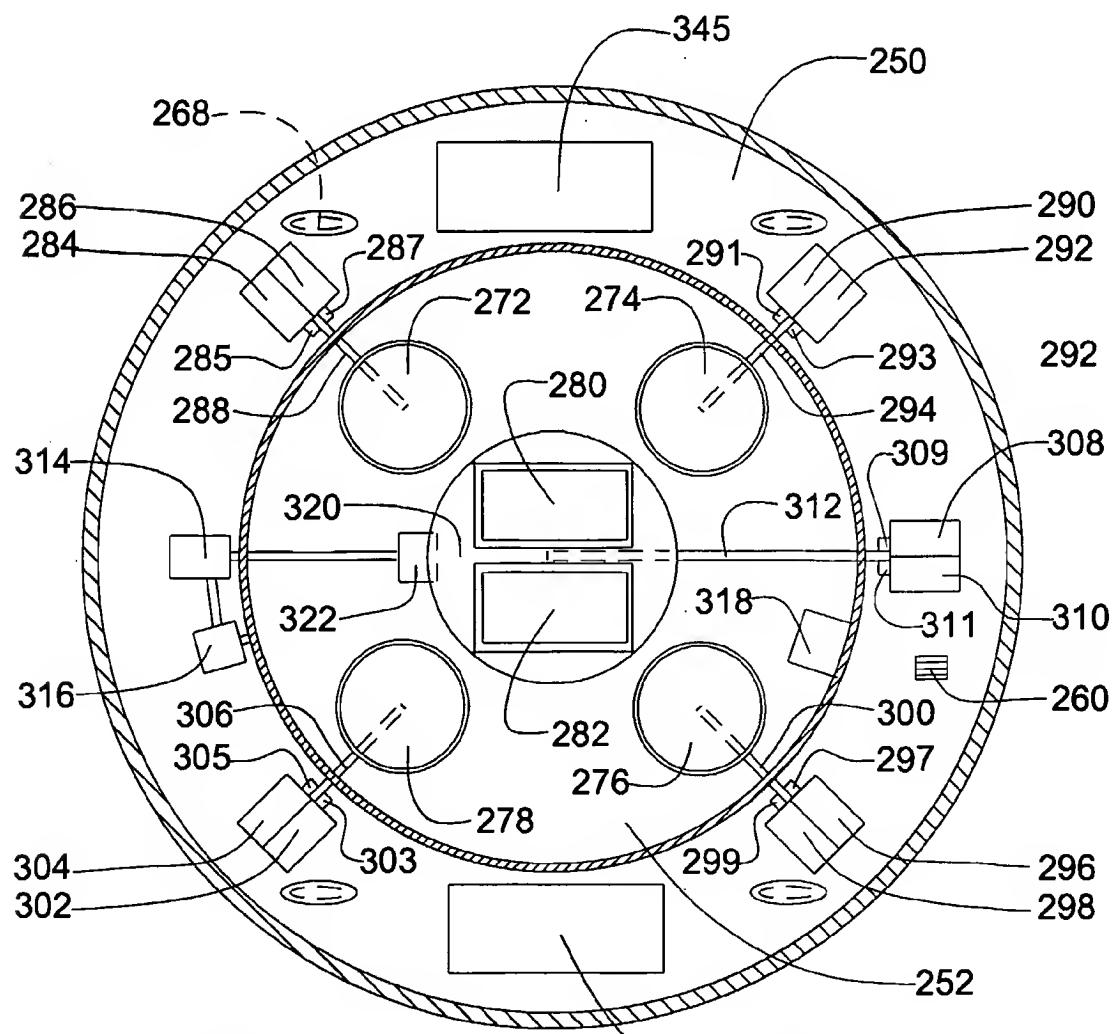


FIG.24

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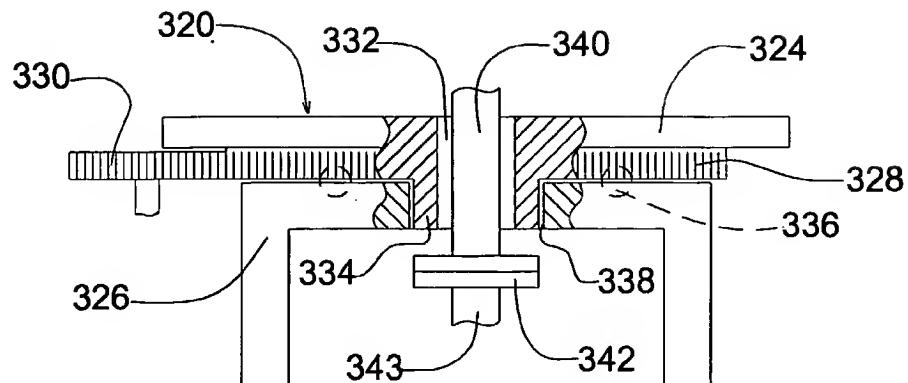


FIG.25

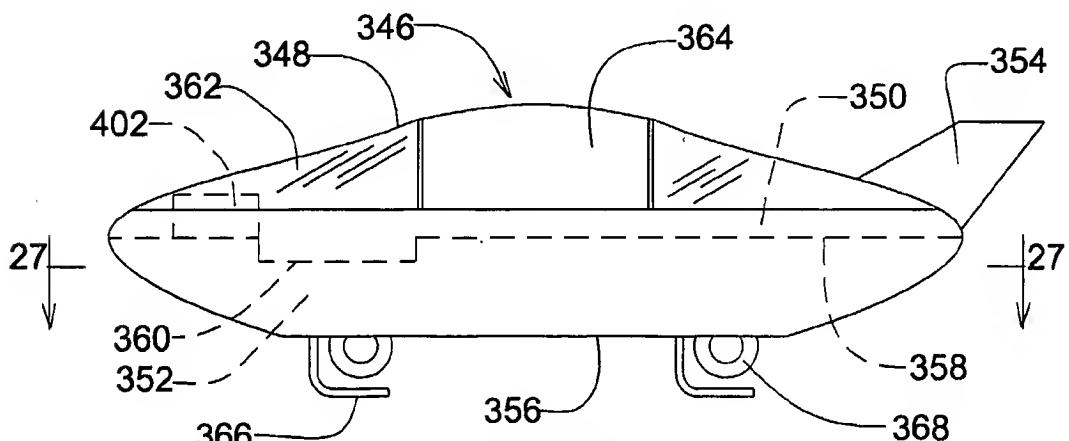


FIG.26

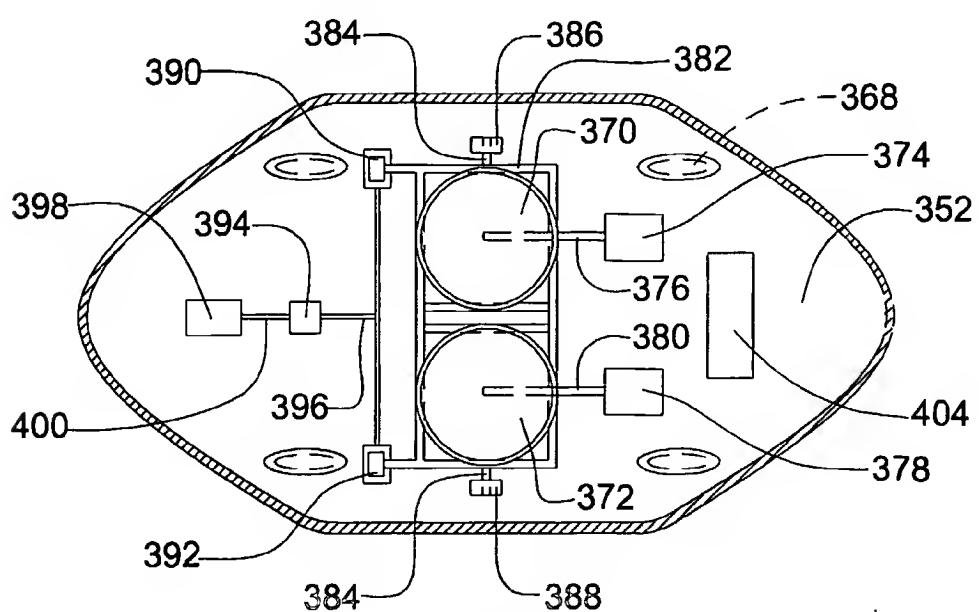


FIG. 27

INTERNATIONAL SEARCH REPORT

International application No.

PCT/VN03/00001

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B64D 27/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC B64D 27/00, B60K 6/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
KR JP:IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

KIPO NPS system: "stator", "rotor", "gas", "force", "generator", "shaft"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2001/0011050 A1 (Yamaguchi et al.) 2 AUGUST 2001 See the whole document	1-20
A	US 2003/0029169 A1 (Hanna et al.) 13 FEBRUARY 2003 See the whole document	1-20
A	US 2002/0120368 A1 (Edelman et al.) 29 AUGUST 2002 See the whole document	1-20
A	US 2003/0092525 A1 (Gu et al.) 15 MAY 2003 See the whole document	1-20

Further documents are listed in the continuation of Box C.

See patent family annex.

- * Special categories of cited documents:
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

19 FEBRUARY 2004 (19.02.2004)

Date of mailing of the international search report

20 FEBRUARY 2004 (20.02.2004)

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Facsimile No. 82-42-472-7140

Authorized officer

JANG, GI JEONG

Telephone No. 82-42-481-8141

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/VN03/00001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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